

# COMPUTERWORLD

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NEWSPAPER



## Memorex CPU Users Stranded but...

### 'It Could Have Been a Lot Worse'

By Michael Weinstein  
Of the CW Staff

The tragedy of firms quitting the computer mainframe business is that these firms have to stick around for the funeral, bury their portion of the body, say their requiem and then try to slip quietly away into another enterprise.

Unfortunately for the user, the major portion of the dead body lies spread out through the country in the form of sold or leased computers.

In July Memorex announced its exit and released users from any obligations to keep MRX 40 and 50 systems.

The one obligation continued by Memorex is an agreement to support any system on fixed-term lease to the end of the lease period. With

this exception, all other activities will stop.

The message to users is clear: go out and find another warm body. How this will be done is not so clear, and a *Computerworld* survey of users of Memorex computers indicates concern over their ability to quickly find alternatives.

On one hand the current Memorex users feel conversion will be harder than it was for previous stranded users, as no other mainframer has yet come along to take affected computer systems into its fold.

But most users also feel things could have been a lot worse. The newness of their Memorex computers meant that most applications had not been moved over to the newer systems and thus conversion should not be difficult.

(Continued on Page 4)

## Privacy Grows More Public on State, Federal Levels

### • Iowa Imposes Tight Restrictions On Use of Its Crime Data Bank • Major Recommendations Expected From Report of HEW Committee

By Michael Sorkin

Special to Computerworld

DES MOINES, Iowa — Gov. Robert Ray has signed into law tough, new requirements which for the first time regulate how police in Iowa may use the state's crime computer.

The law limits information in the computer to factual data, such as arrest records, and requires that dispositions be kept of all cases.

It bars police from putting any type of intelligence data into the computer. Intelligence data is defined as "information collected where there are reasonable grounds to suspect involvement or participation in criminal activity by any person." This restriction applies only to computerized information.

#### No Surveillance Data

However, another restriction — which applies both to computerized and manual files — bars police from maintaining any surveillance data. Surveillance data is defined as information about individuals "pertaining to participation in organizations, groups, meetings or assemblies, where there are no reasonable grounds to suspect involvement or participation in criminal activity by any person."

This restriction, which applies to local as well as state police, is aimed at preventing a recurrence of a 1969 incident where police kept under surveillance and

took pictures of an antiwar demonstration.

Other aspects of the new law:

- Any person or his attorney can examine information about him kept with the state police.

- Both civil damages and criminal penalties are provided in cases where public officials keep illegal information about a citizen.

- The state police must review the status of every new arrest record every year in order to update it. An Iowa arrest record with no disposition after five years shall be removed from the computer, unless there is an arrest warrant still outstanding against the individual.

- Computerized arrest records must be destroyed after an individual has been acquitted or the charges against him have been dismissed.

Legislative opponents of this last restriction tried hard to have it deleted from the bill before it was sent to the governor.

(Continued on Page 2)

### Governor Worried About NCIC Guidelines

DES MOINES, Iowa — Gov. Robert Ray of Iowa has joined Gov. Francis Sargent of Massachusetts in expressing concern about the lack of national standards governing the FBI's computer network.

In a letter to U.S. Attorney General Elliot Richardson, Ray said: "It is a matter of concern to me that even though Iowa has been successful in assuring its citizens of strong safeguards, with the force of law, in its state computer system, there are no such safeguards presently for NCIC. This situation can adversely affect our efforts here in Iowa."

Ray asked Richardson to divulge precisely what efforts the attorney general is taking to assure nationwide standards are developed for NCIC.

Ray also offered to have Iowa computer experts consult with the Justice Department in developing such standards.

By Edward J. Bride

Of the CW Staff

WASHINGTON, D.C. — Several recommendations with direct impact on members of the computer community were expected to be made to two cabinet officers this week.

On the list are the development of standards for ethical behavior, a push for government independence from "outside" computer consultants and introduction of a strict law covering "unfair information practices."

Elliot Richardson and Casper Weinberger were set to receive the recommendations at a Tuesday morning press conference, called to release the report of the Secretary's Advisory Committee on Automated Personal Data Systems [CW, July 25].

The committee was formed by Richardson when he was Secretary of Health, Education and Welfare. Now attorney general, Richardson and HEW Secretary Weinberger have expressed continuing interest in the committee's work, sources noted.

#### Speculation on SSN

Although results of the long study into computers and privacy could not be confirmed, it was believed the committee

would call on Weinberger to issue a policy statement discouraging the adoption of any standard identifying number, with or without the Social Security Number.

The committee, sources predicted, would also recommend that HEW encourage the development of "standards of ethical behavior and professional competence" for DP personnel.

Federal legislation on the unfair information practices act (UFAIPA) is expected to be passed soon.

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### Secret White House Data Bank Uncovered

By E. Drake Lundell Jr.

CW Washington Bureau

WASHINGTON, D.C. — A secret data bank on more than 5,000 individuals accessible only to the White House may be the "ultimate in governmental data banks," according to Sen. Sam J. Ervin (D-N.C.).

The secret file was uncovered in a survey of governmental data banks conducted by Ervin's Subcommittee on Constitutional Rights, but so far White House officials have not delivered requested information to the committee about the contents of the file.

(Continued on Page 2)

### Girl Charged in Program Theft

By Patrick Ward

Of the CW Staff

FORT WAYNE, Ind. — A 19-year-old girl is facing felony charges after she allegedly attempted to sell a service bureau's application software to a client.

Police charge Cynthia Crooks obtained copies of programs developed for a brokerage firm from her boyfriend, who worked as a computer operator in the service bureau. She then called the brokerage house, told its president she had copies of his

programs and offered to sell them to him for \$2,000 in unmarked fives, tens and twenties, police said.

The service bureau, Advanced Computer Systems, Inc., told police it had spent \$70,000 to develop the programs for Patterson Securities, the brokerage house.

However, the president of Patterson Securities "happened to be on our board of directors and wasn't really the right person to call," commented Lou Cook, executive vice-president of

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## Census Uncovers Secret White House Data Bank

(Continued from Page 1)

However, the Office of Emergency Preparedness (OEP) disclosed that the file was maintained and updated regularly by White House personnel. The file is maintained on a Univac 1108 computer system at an undisclosed Department of Defense installation and is programmed in Fortran V, the OEP disclosures indicated.

Some committee staff members, nevertheless, have indicated the file might contain information on political dissidents or "enemies" of the administration such as were contained on the so-called "enemy lists" disclosed at the Watergate hearings.

The secret White House file is among more than 750 government data banks, uncovered in the committee's census of computerized systems, that contain information about individual citizens.

The existence of the file was disclosed

by the OEP in response to the census, but the OEP said it just maintained the file for the White House and did not have any information on what was in it.

In addition, the response to the committee's questionnaire indicates the names in the file can be broken down by sex and geography, but beyond that the OEP said it could not supply any information on the system.

The origin for input into the data bank is also hazy, according to committee staffers.

The OEP response claimed the file is updated by the Office of Personnel Operations in the White House but did not indicate whether that is in fact the only source for input to the system.

According to the filing, the White House is the only agency or body in the government with access to the data bank on an on-going basis, even though it said that the OEP had permission to use the file "in event of a national emergency."

## No Answers Yet

Over a month ago, the Ervin committee requested information on the secret data bank from the White House directly, but so far there has been no response except for indications that the White House was "working on a response," according to committee staffers.

There are two puzzling aspects to the new data bank, according to sources close to the investigation.

The first is why the White House staff chose to go outside for computer equipment on which to maintain the file when it had in-house equipment available. Also, sources asked, why is it being maintained on a machine essentially in control of the military even though under the guidance of the OEP?

Secondly, there is some question as to what will happen to the file when the

OEP is phased out later this year as current plans suggest.

So far, the OEP said, the status of the system after OEP is abolished is still undecided, but other sources have indicated it would probably continue to be maintained by the same defense agency that is currently supplying the computer time and programming.

"The whole file might well be innocent," one observer said last week, "but the secrecy surrounding it would then be puzzling and so would the long delay from the White House in answering the committee's requests for information on the system."

"The provisions that the file could be used by OEP in event of a national emergency puzzle me," another source said. "If it was a harmless personnel file, there would seem to be no need for such a provision," he added.

## HEW Set to Report

(Continued from Page 1)

mation practice is expected from at least two senators, sources said.

Such practice would include keeping "secret" data banks of personal information, as well as files that could not be viewed, copied and corrected by the subjects contained in the files.

Committee Chairman Willis Ware of the Rand Corp. called for enactment of the committee's recommendations, not only by Congress but by HEW "and by the Federal Government as a whole."

Ware also told Computerworld's Washington Bureau Chief E. Drake Lundell Jr. that there were no official plans for committee members to lobby for enactment of any of the recommendations, but that some members would undoubtedly be called to Capitol Hill to testify before various congressional groups.

## Iowa Tightens Up

(Continued from Page 1)

They argued that there is no reason to ever destroy an arrest record.

State Representative Arthur Small, a cosponsor of the legislation, argued in favor of the restriction, saying:

"If a person has been found innocent by a court of law, should that person have hanging over him or her the record of that arrest? Unfortunately, in the minds of too many persons, if a person has been arrested, he is guilty."

Another section of the law establishes a nine-member confidential records council to monitor the collection of information by government agencies.

Among the council's duties are to approve all agreements for the interstate exchange of criminal history data, including Iowa's participation in the FBI's National Crime Information Center. Iowa does not yet have an NCIC hookup.

## Second Time Around Bugs County Tax Program

TIFFIN, Ohio - Bugs are a nuisance anywhere, particularly when they are in a computer program and require doing all the paperwork by hand.

Reprogramming for homestead exemptions and the 10% property tax rollback here seems to have engendered most of the bugs in the tax billing for the first half of 1973, according to Seneca County Treasurer Anne Kerkhoff.

When the first runoff of the tax duplicate arrived on February 26, the county auditor's office discovered that almost 90% of the homestead exemptions were missing from the tax duplicates.

Convinced that the problem was purely accidental, a second duplicate run was made at the computer center, operated by United Appraisal Co.

At that time, Kerkhoff had already requested two delays from the board of tax appeals which extended the tax bill mailing date from December 20 to March 20. The Seneca County Commissioners granted a further 30-day extension from that date.

After a week, the second runoff, with all of the homestead exemptions included, arrived. Unfortunately, all of the new figures weren't perfect either.

"The missing exemptions were listed," Kerkhoff said, "but they had all gotten bumped up one line, so they were with the wrong parcel."

Back to the computer center went the treasurer's tax list and the treasurer's office took the auditor's duplicate so that work could be started by writing in the

homestead exemptions by hand.

"This took at least a week because some exemptions were listed and some weren't - it was really a bad time," the treasurer said. "We couldn't touch the tax bills until all this was done."

The billing is finally underway, but the mystery of the program remains. It might have been a mechanical failure, Kerkhoff said, "because Licking County's tax duplicate was run off on exactly the same program as ours, and they encountered no problems at all."

Not to be defeated, the county is going to use the program again to send out second-half tax bills. "I'm still sold on it, in spite of all the agony. I think it's a tremendous system," Kerkhoff reported.

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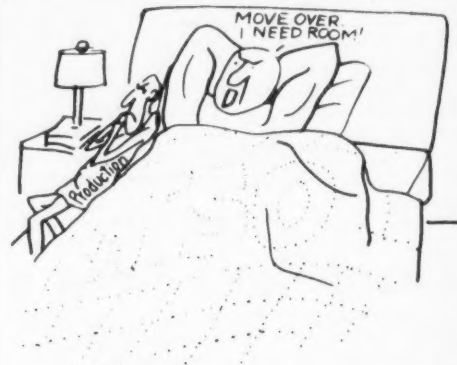
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## U.S. Attorney's Office Denies It Uses DP System to Rate Judges

By E. Drake Lundell Jr.  
CW Washington Bureau

WASHINGTON, D.C. — An impasse has developed here between a superior court judge and the U.S. Attorney's Office over a computer system allegedly used to rate the performance of judges on the bench.

Harold Greene, chief judge of the court, has charged that the Attorney's Office is maintaining a secret rating system on judges to help decide whether they will be reappointed when terms expire.

But the Attorney's Office, while admitting it used a computer system with information on judges, said the system is only used to keep track of case schedules of individual judges and not to rate a judge's performance.

Greene, however, refused to back down. "I don't believe the prosecutor ought to keep tabs on judges," Greene charged.

### Over Your Shoulder

In addition, he said that compiling statistical profiles about a judge's performance could affect his conduct of work on the bench and a defendant might wonder if the judge made a particular decision just because "big brother" was watching his performance.

"There is nothing intrinsically wrong with computers," Greene said. "It's what you put into the computer and the people who use the computer who determine whether the computer is the master or servant," he added.

Greene, who comes up for reappoint-

ment at the end of his present 10-year term in 1976, said he was worried the system might be used by the Justice Department in deciding which judges to reappoint and which to pass over.

Other legal sources indicated that such a system might even be used in trying to get certain judges assigned to certain cases.

"Let's say you've got a fairly weak drug case," one lawyer said. "If you know that a particular judge is usually very hard on drug offenders you might want to try to get him assigned to the case since it would give you a better chance of winning."

"There's nothing wrong with this," the lawyer claimed, and he admitted it was done by both sides in a case. "But with a computer system you could pinpoint more accurately a judge's leanings and even what arguments he was most susceptible to," he added.

The system here is one of the most complex and comprehensive in the nation and was set up under a grant from the Law Enforcement Assistance Administration.

With more than 40,000 cases contained in the data bank, the system is designed to help the U.S. Attorney's Office keep track of the case load so that it can ensure that important cases are tried.

For example, the system can list certain cases that have been pending for over a certain period of time, so that cases do not become too old or stale.

## 'It Could Have Been a Lot Worse'

(Continued from Page 1)

Typical of these users is Tom Justice, operations manager for Wheel Horse Products, South Bend, Ind. Justice received his MRX 40 in February but because of delays in getting the system up and running he had only moved one application (accounts payable) to the new system.

And these delays apparently were his salvation, as his firm kept an IBM 360/22 to perform needed processing until the whole system could be moved over. Thus, when Memorex said it was calling it quits, it was not too difficult to move this one application back to the IBM mainframe.

But if users had operational options, some felt they suffered professionally and nearly all believed a superior computer system was being withdrawn.

"How can I ever go back to management and recommend they go outside IBM?" questioned Norman Salinsky, DP manager of Everlon Fabrics, Closter, N.J. Salinsky typified a feeling of some Memorex users that it would now be harder to justify a mainframe other than IBM's. Further, those managers who did justify the Memorex machine will have their position eroded and will find it harder in the future to make independent suggestions, Salinsky said.

Another theme was voiced by Paul Bultmeyer, DP manager at Educational Read-

ing Service, Mahwah, N.J.

"We've lost our best computing hardware (MRX 50) and we are now forced to look at the second," he said.

In this case, the second alternative being considered is a third-party leased IBM 360/30.

The MRX 40 was cheaper than the IBM Model 30 and provided much more computer, Salinsky said. "The operating system was comparable with IBM's OS in a computer system we could afford," he added.

But with Salinsky as with Tom Justice it was Memorex's inability to get Release 2 of the operating system up and running that saved the user.

"We wanted to go native (run directly under Memorex operating software) as opposed to operating in an emulation mode."

Could the end have been a little less abrupt and did users fault Memorex in the manner in which it handled its mainframe demise? In this area, users were mostly sympathetic with the firm. Surprisingly, users wished the break had come sooner.

In any case, most users stated the demise came as no surprise, as Memorex's troubles had received adequate news coverage to forwarn users that danger was coming.

## Tape Reels Take a Trip 'Downstream'

By Toni Wiseman  
Of the CW Staff

SPRINGFIELD, Ill. — What do you get when you cross a mother-in-law with computer tape reels? A clogged sewer.

Within the past four months, eight magnetic computer tape reels, belonging to the State of Illinois Department of Public Aid, have been removed from the city's sewers, and in another incident, a policeman retrieved two reels from a group of children who were playing with them in the street.

But there is a simple, if somewhat preposterous, explanation to the mystery.

It is department policy for worn-out tapes to be placed in a disposal bin, sometimes erased and sometimes not, according to department spokeswoman Barbara Wright. A year ago, she said, a night shift operator asked the supervisor if he could take

some of the old tapes home and try to cut them down for use on his tape recorders.

When this proved unfeasible, she continued, he put the tapes in a box in his garage.

Shortly thereafter he married and went on his honeymoon. While he was away, according to Wright, his mother-in-law cleaned out the garage as a surprise and put the tapes out with the garbage.

Neighborhood children got into the garbage and started playing with the reels. As a result some of them ended up in the sewer. They were discovered after the 11-3/4 inch reels clogged the 12-inch sewers.

Four of the reels contained data, Wright admitted. "But it was all work material and useless without the master tapes here at the department. So actually the tapes were of no value to anyone," she said.

## Teenager Charged in Program Theft

(Continued from Page 1)

Advanced Computer Systems.

"He immediately called us; he also called the police and the police told him to go ahead and make an offer and they'd set it up, so that's what they did," said Cook.

"Once she had the money police picked her up," he said.

The girl's boyfriend, who police said furnished her with the programs, was not charged.

"There was no intent to steal on his part," Cook said. "He pleaded he did not know what the other person was going to do with [the programs]."

To make the copies, Cook said, the computer operator took at least 8,000 or 9,000 punched source deck cards, put them on the computer and had the programs listed out on paper. Later, he reportedly took the almost 12-inch thick pile of printouts from the building.

The computer operator is said to have later placed the box of printouts in a shopping center lockbox. While he was shopping elsewhere, police said his girlfriend took the box to make the exchange.

The computer operator was originally suspended from his job at Advanced Computer Systems when the alleged theft was first discovered. Since then he has been fired because the firm decided that "ignorance is no excuse," according to

Detective Sgt. Fred Beck.

Advanced Computer Systems may make some changes to prevent a recurrence, Cook allowed. But, he said, "the only thing you can do is screen the people. But even this man, we're not sure that he's dishonest."

"We have pretty tight security," Cook continued. "We have all the doors locked and the place is manned around the clock; we have a vault that everything is placed in when people aren't here; the only other way you could handle it is to have the owner stand here and watch 24 hours a day."

The girl is free on \$1,000 bail, reduced from \$10,000, and is awaiting a hearing.

## Rinehuls Quits PLC Secretariat Post

Special to Computerworld

NEW BRUNSWICK, N.J. — The resignation of William Rinehuls as secretary of the Programming Languages Committee of Codasyl was confirmed in the minutes of the committee issued here last week.

Rinehuls had been serving as secretary and acting vice-chairman. He was the author of the unsuccessful attempt last year to have the Report Writer dropped from Cobol.

After resigning from the secretariat, Rinehuls initiated a "closed envelope" vote at the June meeting to obtain new candidates for the position next term of PLC chairman. The chairman of PLC is appointed by the chairman of the Codasyl Executive Committee each January. No official announcements of the results have yet been made, but it is believed that the three frontrunners are: Mabel Vickers, National Bureau of Standards; William Brown, AT&T; and Ron Ham, the current chairman. Contacts inside the Codasyl area indicate that Ham will probably be reelected as committee choice for chairman.

## ACM 'Journal' Relabeled

NEW YORK — Due to a labeling error, during the process of publication of the July issue of ACM's *Communications* and Volume 20 of the *Journal*, 9343 copies of the *Communications* were labeled and mailed using *Journal* labels.

As a result, 9,343 ACM members will receive two copies of the *Communications*.

The error caught, Waverly Press has prepared new *Journal* labels and the issues will be in the mail soon.



# PDP-11 BOTTLENECK ???

## DOS-M CONVERTS DOS-11 INTO A MULTI-USER SYSTEM!

DOS-M is a sophisticated multi-partition, multi-task operating system superimposed upon Version 8 of Digital Equipment Corporation's Disk Operating System for the PDP-11. DOS-M provides facilities for multiple terminals each possessing DOS-11 command capabilities, device spooling, priority multi-tasking within partitions for real-time data requisition plus many other features.

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## Firm's 360/50 Serves Variety of Masters

By Marion Rubenstein  
Special to Computerworld

DALLAS — Management Systems Corp. (MSC) of Texas uses its computer for such diversified tasks as dispatching trucks, controlling wine inventories and maintaining savings and loan accounts. And to attract new customers as well as keep its current customers up-to-date on the firm's equipment and its uses,

MSC issues a monthly newspaper.

"We find this newspaper our best way of getting new clients," said William K. Denton, director of marketing.

"To make optimum use of our IBM 360/50 we have had to develop a means for operating quite dissimilar systems within one central processing unit," Denton explained.

To make the system work for the variety of customers MSC serves, two on-line systems are operated concurrently. These separate systems operate in a teleprocessing mode using a variety of terminals — CRTs, teller stations, typewriter outputs. Batch services are also provided in background on the computer, he said.

"The important technical feature of MSC's computer system is the fact that it operates with both Btam and Qtam message processing capabilities. The disk operating system has been modified so that the Btam system operates as a separate task in the

F2 partition. Qtam resides in the F1 partition and has priority over the Btam processing. Qtam directs messages either to the Btam task or to other tasks also residing in the F2 partition," Denton continued.

"Leased lines connect MSC's system to many cities in Texas and to one point 1,000 miles distant in the north central part of the U.S. Both TWX and Telex messages are handled as routine inquiries into the system. Thus, from locations throughout the continental U.S., a user can and does dial into the MSC computer and receive responses on an unscheduled basis," he concluded.

## Conn. Studies 'Wasting' Waste

HARTFORD, Conn. — The expression "garbage in, garbage out" has taken on new meaning for this state which is conducting a computer study to determine the best disposal processes for the state's annual average of three million tons of solid waste.

In cooperation with state officials, General Electric is collecting data for the entire state, looking at all existing facilities — incinerators, landfill, etc. — their location and life expectancy, and compiling the data at GE's research center.

Possible new plant locations are being considered, and studies run to determine what each of the new plants would cost in capital requirements, operating costs, debt service and amortization.

"We're also looking at zoning, transportation, future population patterns, and the expectant life of the new facilities," said Paul McGavin of GE, "and gaming the whole thing on a 605 to come up with the most economical system, trading off plant size with the distances which would have to be traveled.

The final statewide plan will

indicate the best types of facilities and approximate locations, within a five to 10 mile range, according to McGavin.

## License 'Lost'

ALBANY, N.Y. — Getting a duplicate driver's license can be one long headache if the computer decides you never had one to begin with.

When Ursula C. Cummings noticed her license was missing last April, she went to the State Department of Motor Vehicles, ready to pay the \$3 for a new one, but the computer had no record of the license.

An official suggested that the computer rejection might be caused if she had ever failed to use her middle initial, lied about her age or ever dropped the letter G from her last name.

Cummings, 66, said none of the cases apply to her situation.

A "licensed" driver for 45 years, she now faces the prospect of having to take out a learner's permit and submit to the road test and other examinations to get a new license.

She doesn't blame the computer. "Seems to me it has to be a human mistake somewhere along the line," she said. But she does hope a human will intercede with the computer and get back her license.

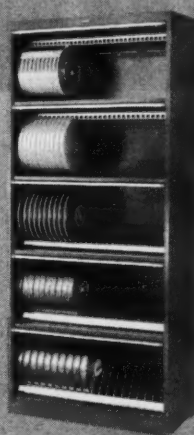
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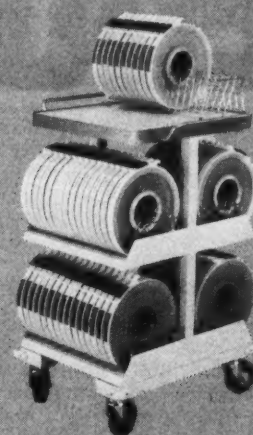
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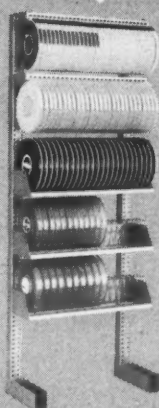
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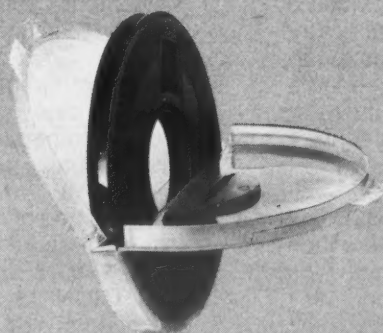
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## Insufficiencies Cited at DP Centers

# Societies Blast UK Census Security and Confidentiality

By Joseph Hanlon

Special to Computerworld

LONDON — Security and confidentiality in the 1971 UK census were both weaker than the public thought, according to studies of the census by the British Computer Society (BCS) and the Royal Statistical Society (RSS). And the data was more widely available than most people realized, while security procedures in the computer centers were inadequate, the studies charged.

The studies were requested by the government in May 1971 in response to what the BCS and RSS each called "considerable public disquiet . . . about the possibility of leakages of personal information."

The RSS added that "this disquiet arose particularly because it became generally known that extensive use would be made of computers."

The very existence of the studies is

considered remarkable by many sources; it is highly unusual for the UK government to permit outside organizations to comment on its operation.

The government released last month summaries of the BCS and RSS reports, plus two public opinion surveys and its own comments, in the report on "Security of the Census of Population."

### Basis for Surveys

The RSS revealed that the Office of Population Censuses and Surveys (OPCS) "can disclose census information to other sections within the office."

In particular, data from the 1971 census has already been used to select people for follow-up surveys on nurses, income and manpower. Further, the RSS charged that because local officials work on the census, "cases have arisen where the enumerator could make use of the information he has gathered in the course of his

normal duties."

The BCS was highly critical of procedures at the OPCS, which processes all English census data and half of that from Scotland. The BCS said that OPCS should aim for "the standards achieved and maintained" in the Scottish Office Computer Service which processes the other half of the Scottish returns.

In particular, the BCS said, there were "weaknesses" in procedures to prevent corruption of data, leakage of data and identification of individuals. It cited insufficient physical security in the OPCS computer center and inadequate checks on data preparation.

The government was clearly displeased with the two studies. Although it accepted specific details, especially in the BCS report, it rejected most of the more basic suggestions. And it complained that the BCS "fails to give credit to the protection afforded by the unbroken tradi-

tion of census confidentiality which is faithfully maintained by the staff."

The government flatly denied most RSS charges. It said there had been no leakage of information and only one prosecution of staff during 1971 for revealing information. On the three follow-up surveys, the RSS said "most people are not fully aware that . . . the follow-up, unlike the census itself, is on a voluntary basis."

The government replied that "all potential respondents are clearly informed that participation in follow-up surveys is voluntary."

The main government defense against the BCS and RSS charges seemed to be that the public did not really think the census was confidential. It released the results of a public opinion poll taken at the same time as the census, which showed that 27% of the people thought that census data was available to all government employees and only 47% believed census data was "fully secure."

The survey also showed that 13% "felt strongly" that some questions should not have been included on the census, primarily place of birth of parents, dates of marriage and children's births and occupation and working hours.

The RSS also alleged that not many people took the option of keeping their returns secret from the enumerator by mailing it because "the generally held view is that the right is only exercised when the individual has something to hide."

The government said: "Nowhere was the impression left that the census organization regarded the personal or postal return as a device for those with something to hide."

Finally, the RSS asked to have defined "in a suitably explicit manner the principles which apply to . . . use of census data." The government replied: "No elaboration is called for."

The government did accept, and has already put into use, one RSS suggestion. There is a danger that when small numbers appear in statistical summaries, it will be possible to work back to individuals. Therefore, the RSS suggested that small errors be added randomly to the data. This is expected to have a significant effect on small numbers, but none on large numbers or averages.

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## Psychiatrists Lose To DP in Spotting Potential Suicides

MADISON, Wis. — Are you a suicidal type? A computer at the University of Wisconsin Department of Psychiatry may be able to predict your suicidal tendencies more accurately than a doctor.

The computer has so far outscored 21 psychiatrists in identifying people who had attempted suicide. The computer was correct in 70% of the cases, the doctors in 40%.

"The program, which was developed under a National Institute of Health grant, is an effective way of predicting suicide," said Dr. John Griest. Using a branching program which models a human interviewer, the patient is interviewed on-line at a computer terminal.

After evaluation of the data, Griest said, the computer assigns the patient to one of four outcome categories — lethal, non-serious, continuing to have disturbing suicidal thoughts or ridding themselves of suicidal thoughts.

The man/machine interaction may have something to do with the results. "We get fantastic reinforcement from the patients for the use of the machine," Griest said. "They love it. You hear about warm, compassionate doctors, but a lot of the time they're busy, give negative feedback or forget to ask pertinent questions. The computer never does."



## Teaching Jane to Spell Takes a Twist

By Toni Wiseman  
Of the CW Staff

PITTSBURGH, Pa. — Spelling, long-time nemesis of school-children and adults alike, is now a computer's headache.

Dr. Herbert Simon, professor of psychology and computer sciences at Carnegie-Mellon University, and his wife Dorothea, a researcher with the University of Pittsburgh's Learning Research and Development center, used a computer to simulate the spelling processes used by selected fourth graders at a local school.

Evaluation of the data revealed that rules could not regularize the English language, but it would help to teach children a variety of optional ways of spelling a certain sound. A child could then use the homonyms in a trial and error method, until the word appeared correct.

"The key in such a method," said Simon, "is that the child must be able to recognize complete words and most readers only look at the beginning and end of words."

Simon fed a PDP-10 visual information, the type of recognition information which an individual would have stored as the result of having seen words in print over the years. The computer also received input on information about alternative

phonetics which can be used to spell homonyms.

The computer was requested to spell specific words it was given through simulation. To achieve a spelling, the computer tried to use both sources of available information. Both forms of information are incomplete, however, since the visual tells only how a word begins and ends, and the phonetics only that there are several ways of spelling the same sound. The computer was not given any guidelines to select the correct phoneme.

The computer made frequent errors, according to Simon, mistakes of the type people most

often make, such as not doubling a consonant before adding "ed." The program also did a good job of predicting where in the words a high incidence of error would occur, he said.

The Simons found they could improve the computer's spelling by supplying more visual or recognition information, or cause the spelling to deteriorate by giving less visual information.

"This," said Simon, "suggests that probably, except for a couple of simple rules, like I before E except after C, the best way to improve spelling is to give people more experience looking at words."

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## Editorial

### Ends and Means

A Tennessee company will sell you, for \$5, some routines that will crack the scrambling code used in Hewlett-Packard mainframes.

An official of the company said he doesn't want to make money, but just put pressure on the manufacturer to improve the system.

An admirable goal, but at what cost?

These routines may place every HP user's security in jeopardy, and it seems there must be another way to accomplish improved security. Furthermore, the burden on the user's password system is now greater.

There is concern about the legal ramifications of selling such a product, but more important is the use of the product until HP comes up with better security software.

For example, students were able to unscramble a professor's quiz file, thereby possibly compromising the educational process.

There is additional concern that the company itself, an HP customer, is trying to invent its own solution. Whether it will try to sell the solution to HP, and whether there will be intentional "cracks" in the solution, remains to be seen.

But it was a dark day for the user community when "secure" software was cracked, and the chisel became generally available.

## Toward Zero Efficiency

In an editorial last week, I rehearsed the *Computerworld* position on suppliers in general and IBM in particular: that we love the user more. There was more to it, but that was the thrust. Now, how about my personal attitude?

Main thing, as I often mention on the ACM lecture circuit (and stressed in my two minutes on the CBS "Morning News" last spring) is that I *admire* IBM. I'm proud to have worked for them in the antediluvian Watson Lab days. Every time they fired me, they had to pry my fingers loose from the door jamb one at a time, while I yelled, "No! No! I like it here!"

And I think the surviving pioneers and the computer historians underplay the IBM role in the forties and early fifties, *versus* ENIAC and JOHNNIAC.

Moreover, I think IBM is by far the best of the giant multinational corporations impinging on society today. Com-

### From the Editorial Director

pared with oblivious Unilever, selfish General Motors or beastly ITT, our concerned if humorless Power in Armonk looks great.

If we are to be ruled from an executive suite, I'd choose Galactic Headquarters by a wide margin. IBM backs the arts, the sciences, the minorities and novice customers. It is amazingly vital and alert, probably because it has always been run by salesmen rather than beancounters or lawyers.

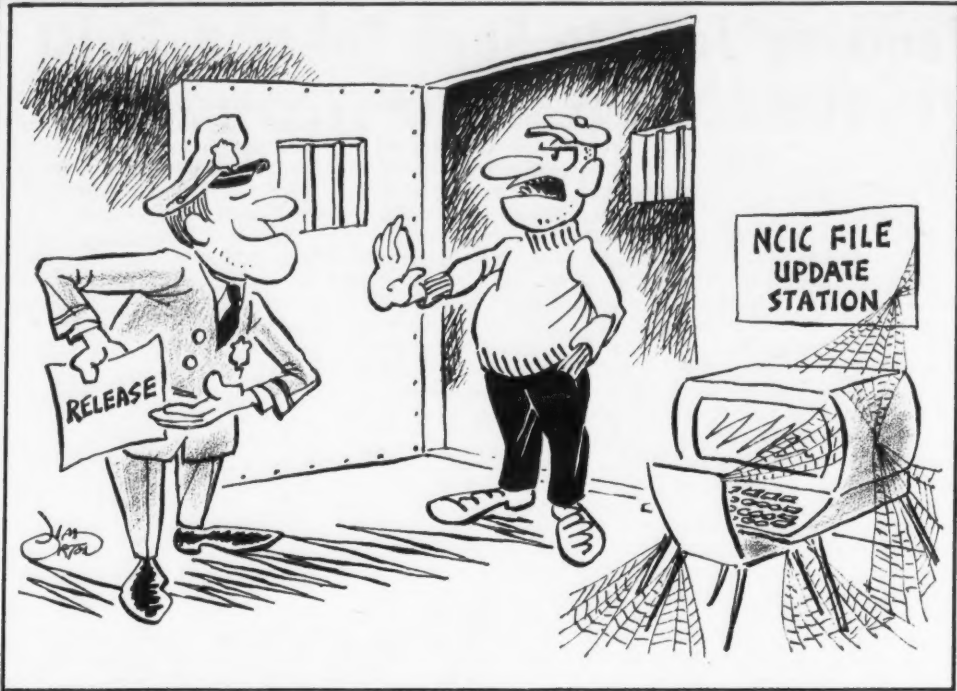
But I want an entirely different level of responsiveness — democracy, not benevolent dictatorship. I want the country and the world to vote on its leaders, even with horrors like CREEP, rather than be eaten alive by giant corporations.

And in the ADP arena, where our meeker CW readers are being dipped in tar and burned at the stake, and our nimbler ones play *retarius* against heavily armed suppliers, I shudder at the hecatomb to come.

Remember our syndrome: the manufacturers want us to be as *inefficient* as possible, but not quite to the point where we switch to a competitor. Then extrapolate to a one-supplier universe, an IBM universe. Even if they maintain their Watsonian benevolence without the pressure of competition, user efficiency will be forced ever closer to zero.

(My most valued critic, who is still down in Potomac, Maryland, selling the family igloo, suggests "White Hats, Black Hats" for this personal commentary. RGW of London, England, sent in "The Doctor's Dilemma." Other nominations from the floor remain in order.)

Herb Gross



'No Thanks, I'd Just Get Picked Up Again - I'm in the NCIC File'

## Two Chilling Views of Iceberg

### Double-Density 3330s Interim?

By Ronald A. Frank  
Of the CW Staff

The introduction of a double-density 3330 disk system was a pleasant surprise to users. The relative ease with which IBM plans to convert a conventional 3330 disk to a double-density upgrade means that plug-compatible equivalents will be forthcoming soon from the independent peripheral companies.

By doubling only the amount of tracks per disk surface while keeping rotational speed, access time and other parameters constant, IBM has concentrated all required changes in the drive instead of tampering with the controller.

#### More Freedom

This should make it easy for independent suppliers to come up with independent products. And the non-IBM double-density products will probably operate with larger 360s (Model 65 and up) as well as non-virtual 370s such as the 155 and 165.

And if the independent double-density disks have these added features at a reduced cost, how can the user go wrong?

But the concept of a double-density disk on a virtual system needs some close examination by potential users. If a given data set was stored on four drives of conventional density disks, some degradation might occur.

By having twice the amount of data in contention for half the number of read-write head mechanisms, the paging transfer rate in a virtual system could be degraded, according to one systems specialist. Obviously these questions cannot be answered conclusively until delivery of the new 3330-11s in March 1974.

It is interesting to note that IBM has included the Write Format Release feature in the double-density disks. This capability was first introduced by Itel on

its 3330-equivalent drives in 1972.

The feature allows concurrent disk functions to take place while a double-density drive completes a formatted write command chain. This will allow improvement in disk operation by freeing the I/O channel and control attachment while the drive erases to the end of a track from the end of a formatted write record, according to IBM. During the erase operation, the disk actually writes all zeros.

The double-density 2314/2319s were introduced by independent suppliers and they went a long way toward prolonging the usefulness of the 360s. It is to be hoped that IBM is now thinking of the welfare of the 370 virtual user who needs additional disk capacity. It is obvious, however, that the new drives could also have been attached to non-virtual configurations if IBM marketing had allowed such a move.

#### Easily Supported

From a hardware capability standpoint, the double-density 3330s could easily be supported on non-virtual systems. The restriction that the double-density disks can run only with virtual operating systems is strictly a function of the System Control Programming.

The original 3330s were introduced to run with DOS and OS systems from the 370/125 on up, including the 360/195. The new disks are compatible only with OS/VS1, OS/VS2 and VM/370. This eliminates the 370/125 which runs under DOS/VS and the 370/195 which is not a virtual system.

Strangely enough, the 125 can handle the regular 3330s but not the double-density version. Apparently IBM believes these users should look to the new 3340 disk system for increased storage.

The more important question relates to the long-term usefulness of a moving-head disk device with virtual systems. It is to be hoped that the double-density 3330s are not merely an interim system designed to at-

tract users until a fixed-head storage system is introduced.

### Non-VS Software May Accept Units

By Michael Weinstein  
Of the CW Staff

Control the design of the central processor and the operating software and you effectively control the entire computer system.

The supplier of these hardware and software components calls the shots as to what peripherals must look like and how software must operate.

Hence, this key component manufacturer can (if he wishes) effectively control the type of computer operations users must perform to take advantage of some new technique by tying operation to the design of processor or operating software.

Consider IBM's recent release of double-density 3330 disk storage subsystems. For users this is a beneficial release addressing a prime consideration: reducing the cost per byte of on-line storage.

But in releasing the new disk subsystem slaved to VS operating systems, IBM has effectively told users they must speed efforts to begin virtual memory computer operations or they will not be able to have the most cost/effective peripherals.

There is no apparent reason why the new double-density 3330s could not be designed with a minimal effort to operate under non-virtual software as did the older 3330s. The only engineering change in the newer models appears to be related to the read/write heads and the number of cylinders per disk pack.

*Computerworld* welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

(Other viewpoints, letters on Pages 9, 10)



## Angler's Situation Escalates

# Do Vendors Break Promises?

Last week I talked about an amazing affair in Flushing, N.Y., where Honeywell last December proposed a turnkey computer operation to a small EAM-oriented user. Honeywell then appeared to disown its proposal by refusing to meet either its original schedule, or a schedule that had been pushed back by a month.

The official reason given to me by Honeywell's branch manager John Kells (and apparently supported by Honeywell's executive vice-president Clancy Spangle) was that the turnkey operation was not part of what Honeywell called "the" contract.

"The" contract, they said, did not reference the proposal, and therefore Honeywell was not bound to make good on the promises in the proposal for the turnkey operation. (Honeywell since then informs me that this point is being restudied.)

Last week I viewed this activity as a form of "bait-and-switch." However, a further analysis of the situation suggests a better name for the technique apparently used with Angler's is "bait-and-wait." Let us distinguish between them:

- **Bait-and-Switch** — a vendor offers some item at a low price, gets a customer interested, and then by immediately disparaging the item that was advertised, persuades him to sign a more expensive contract. It is a well known, but unethical, technique.

- **Bait-and-Wait** — an attractive offer is made, accepted and apparently instituted with mutual agreement. Then, after a period of time has elapsed during which the buyer has committed himself to the vendor, a totally new arrangement is proposed, while the vendor refuses to proceed on the original agreement. This ruse obviously is more sophisticated. The buyer, who by now has lost freedom of action, finds it difficult not to accept the new situation and often makes the best of it.

Elements of both stratagems can be seen in the Angler's operation.

On one hand, Honeywell's basic claim is it has fulfilled its contract liabilities (to the extent

possible) just by fulfilling the machine services contract that Angler's signed. Yet Honeywell promised something quite different in the proposal. If Honeywell's point of view is correct — and the proposal promises are invalid — then the pattern conforms to bait-and-switch selling.

The proposal promises can be regarded as the bait, and the machine services contract can be regarded as the less attractive system switched to.

Under the other hypothesis — the bait-and-wait idea — it does not particularly matter whether the proposal, machine services contract or both, are legal agreements.

What matters is that when a dispute arises after a considerable period of mutual preparation, the vendor can take a hard-nosed attitude because a user normally would have nowhere to go and still be able to meet his corporate aims.

### Bait-and-Wait

Judged by when the problem was uncovered, and what has happened since, Angler's case is more correctly described as a case of bait-and-wait, rather than a case of unsophisticated bait-and-switch selling.

What really worries me is the apparent smoothness of the sophisticated operation which could indicate that bait-and-wait selling is occurring widely and is not restricted to occasional isolated cases.

For instance, consider the following five points — all of which can be seen in the Angler's case.

- The proposal was professionally put together.
- The hardware contract with its reference to some undefined programming contract passed legal review without objection.
- Smooth phrases were used by branch manager Kells in drawing attention to the complete agreement clause and the use of this clause to disown the proposal — even though the clause is specifically restricted to the subject matter of the contract, i.e. hardware characteristics and prices.
- Angler's was unable to make contact with branch or corporate offices at critical periods, such as June 25 through June 29.
- Requests for an investigation were brushed away at corporate level without any attempt to gather information directly from the prospect to check on the accuracy of the branch's claims. Any one of these points alone

would be understandable, but the appearance of all five together may be evidence of a pattern — a pattern that is not comforting.

### Angler's an Exception?

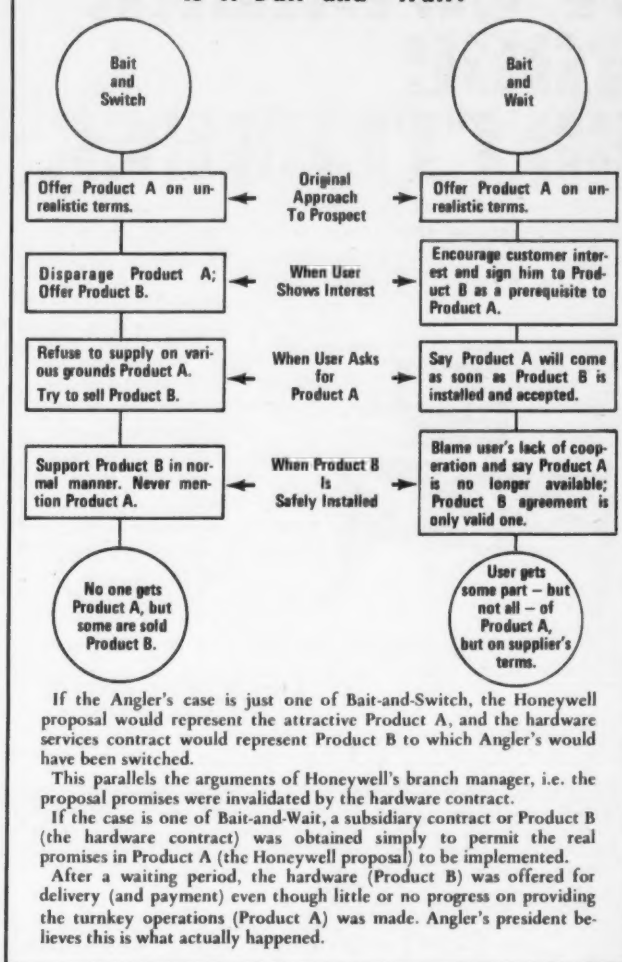
In fact, the existence of these occurrences brings up forcibly the question of whether there are any other cases of Angler's-like activity going on around the country — or even cases where such activity may have been attempted in the past.

If there are, knowledge of what their characteristics were (even if the actual identities must be concealed) would form a very useful base upon which future considerations of contracts and proposals can profitably be based.

So if you know of any cases Angler's problems bring to mind, you can perform a valuable service to the profession by dropping a note to me at 633 Central St., Framingham, Mass. 01701, or else by completing the questionnaire. Thank you for your cooperation.

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## Is It Bait and Wait?



## Have You Been Baited and Waited?

The problems Angler's Co. is having with the implementation of its turnkey operation may be unique — or may be quite usual. Certainly the problems do not appear to be just local. If you have had any problems during the installation of small systems — such as the Honeywell 58 or the IBM System/3, etc. — please

fill in this questionnaire so we can see whether there is a significant trend.

After filling out the questionnaire please return it to Alan Taylor, 633 Central St., Framingham, Mass. 01701. Your answers will be held in strict confidence if you so desire. Thank you.

1. Briefly, what was your problem?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. What system were you considering?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. When did the problem become recognized?

- ☐ Before contract
- ☐ Between contract and specification
- ☐ During programming and before Implementation
- ☐ After implementation.

4. How serious was the problem to you?

- ☐ An unexpected change, but not really inconvenient.
- ☐ Inconvenient, but not really serious.
- ☐ Serious, but not sufficient to halt implementation.
- ☐ Resulted in the delay or cancellation of scheduled implementation.

5. How well did your supplier act in advising you of the problem?

- ☐ He could not have been expected to see the problem before he advised us of it.
- ☐ It looks as though he should have been able to advise us of the problem earlier than he did.
- ☐ He appears to have had definite warning that the problem was coming before he told us about it.

6. How well did your supplier act when the problem was noticed?

- ☐ He took full responsibility, and corrected it to our satisfaction.
- ☐ He took some responsibility, and placed some blame on us.
- ☐ He effectively placed the blame for the problem on us.

7. How happy are you now about the final results of the way the problem was dealt with?

\_\_\_\_\_

\_\_\_\_\_

8. Should the information you have given in this survey be treated confidentially?

- ☐ Yes ☐ No

Name \_\_\_\_\_

Title \_\_\_\_\_ Telephone No. \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

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## Existing Organizations Can Fulfill Need for Professional Certification

By Michael J. Viehman  
Special to Computerworld

After hearing Fred H. Harris talk recently about certifying computer personnel, I was so enraged I could hardly sleep. Certifying and regulating the practice of computer system development is an insurmountable and undesirable project, for the following reasons:

- The field is too dynamic and will become more so - testing and verification will be haphazard at best because the common knowledge base in the computer profession doesn't exist.

- The computer field is uniquely self-testing - every time a process is run on a machine it is reviewed by an unusually infallible, overly objective critic... the machine. More managers should test (and re-test) their programming concepts this way.

- Another large organization to test and categorize people is counter-productive to generating professional interest and ad-

vancement of the individual and collective state-of-the-art, e.g., the best computer person I know of has failed his M.S. exam seven times, but he has taught all of his coworkers and supervisors

### Viewpoint

how to put together manageable, functioning software.

- Reliance upon standards is a poor way to judge and utilize computer personnel - the best systems are produced by small, self-governed, synergistic groups who may look very bad on paper but function as a group, taking pride and responsibility in the group's performance.

Several things are needed that are and can be fulfilled by existing organizations. What is needed is for each individual interested in some facet of each organization to attempt to interest other professionals he may come in contact with in such interesting functions of that organization.

The things to be striven for in this context are:

- Exposure to management of the methods and costs of computer software - the fact that some programmers are 10 to 20

times as productive as others, yet are not paid 10 to 20 times as much and the others are permitted to stay, malfunction and go on to higher organizational levels - speaks for the "black-art" status allowed to mildew by professional societies.

- Increase professionalism by rapidly publishing and reviewing current topics across a wide spectrum of interests - many societies do an outstanding job, but another society is not going to foster the wider participation desirable in these programs.

- Actively discourage formal structuring of the profession which limits individual growth and activity, encourages non-personal evaluation and organization of working groups and coagulates the onrushing development of individuals and systems.

Large organizations, be they governmental, union, industrial or professional, tend to hamper free expression and free enterprise.

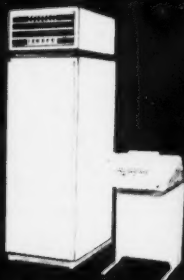
All computer-associated people know from direct experience that this largeness is particularly ineffectual when applied to computer systems.

Michael J. Viehman is with Tetra Tech, Inc., San Diego.

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## Letters to the Editor

### ACM Publications Serve Practitioner

I do not believe Joseph Rigo's viewpoint in the July 11 issue gives the full picture on ACM publications. *Surveys and Reviews* should and do serve the practitioner of the DP arts and sciences.

I could do with less *Communications* to avoid the premium I now must pay for *Reviews*. Here I agree I might be subsidizing a publication vehicle.

However, Rigo completely ignores the pricing structure under which ACM members elect publication options. If an individual member finds a publication useful (say the *Journal*) for whatever purpose, then he can subsidize it under the present ACM publications structure. And I don't have to.

Wade A. Norton

Tuscaloosa, Ala.

### Whose Neck?

I refer to the article entitled

"A Publication Albatross Hangs Around ACM's Neck" [CW, July 11]. With greater accuracy one might well argue that "An Albatross Hangs Around the ACM Publications."

Only the most simpleminded readers will accept the explanation that "the ACM publications exist for the authors." In fact, the ACM publications perform for computer science what all outstanding publications do in their respective fields: they serve as records of progress in the field and as guardians of quality and excellence.

As such, their importance far transcends their function as professional society publications. Indeed, the ACM publications board and the editors have responsibilities to all computer scientists, not only to ACM members.

Gerard Salton

Cornell University  
Ithaca, N.Y.

## Check How Many In Your Industry Use MSA Software Packages

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Banking and Finance	✓	✓	✓	✓	✓	127 138
Insurance	✓	✓	✓	✓	✓	27
Service Business	✓	✓	✓	✓	✓	28 23
Retailing	✓	✓	✓	✓	✓	19 20
Public Utilities	✓	✓	✓	✓	✓	18
Government and Health	✓	✓	✓	✓	✓	17
Other	✓	✓	✓	✓	✓	28 77
	129 188	25 79	148 146	51 54	17 18	488 487

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## Book Marks

### New PL/I Books Show Features, Compilers

*PL/I Programming With PL/C*, by Melvin Davidson; Houghton Mifflin Co., Boston; 228 pages, \$5.95.

This softcover text is keyed to the Cornell batch compiler, but this is not a major problem since PL/C is a proper subset of the full language.

Davidson divides his work in three sections, from basics ("the first layer") to niceties ("the frosting on the cake" in his terms). He has many illustrations and includes practice problems, but puts answers immediately after the problems which may weaken the reader's resolve to work them out on his own.

PL/I PL/I PL/I

*PL/I Programming*, by Paul W Murrill and Cecil L. Smith; Intext Educational Publishers, New York, 412 pages, \$7.50.

Intended primarily as a general text for an introductory course in PL/I, this softcover book devotes considerable attention to the PL/C "student" compiler, originated at Cornell.

There are clearly presented coding examples and ample exercises at the end of each chapter. The solutions to some of these exercises are provided.

PL/I PL/I PL/I

*PL/I for Business Applications*, by Leonard E. Edwards; Reston Publishing Co., Inc., Reston, Va.; 480 pages, \$10.95 or \$8.95.

This book is designed, the author said, to help the reader "face a PL/I installation with confidence." It specifically omits some areas — overlay construction, controlled and based storage, multitasking, teleprocessing — that other authors have included, but concentrates on basic knowledge of the language.

Illustrations, while numerous, are not always readable and this is particularly so with the solutions to the chapter-end problems. To avoid a quick read of the answers, the publisher has screened them in addition to using small type.

PL/I PL/I PL/I

*PL/I for Business Applications*, by Mary Ellen Anderson; Prentice-Hall, Inc., Englewood Cliffs, N.J.; 397 pages, \$13.95.

Written for an introductory course, this hardcopy text devotes the first 60-odd pages to DP concepts. Once it gets into PL/I, however, it does a good job. A subset of IBM's standard F-level PL/I compiler is the author's base, but she documents optimizing compiler differences as well.

The systems analyst-author provides review questions within the text as well as exercises at chapter breaks. The type face and coding illustrations used are very "clean" and easy to read.

### Aid Center Next Step?

## Planning Eases NBS Change to Exec 8

By Don Leavitt  
Of the CW Staff

WASHINGTON, D.C. — As director of the DP center for the National Bureau of Standards, Bruce Ramsay is much like many other DP managers. He is certainly aware of various computer performance measurement and evaluation tools, he would like to use them, but he's just too busy at the moment.

He is — like others — in the midst of a conversion from one operating system to another: in his case, from Univac's Exec 2 to Exec 8 on 1100 series CPUs. And — again, like others — his range of responsibilities almost rules out his introducing the use of the performance measurement tools until a lot of "missionary work" is done first.

But, he said, he has an idea that might enable his group at the data center to help users without overstepping their assigned support function and accidentally offending any of the user departments' programmers or their managers.

Ramsay has been looking at the "programmer assistance center" concept as implemented by Nasa, and wondering if it couldn't be applied at the NBS site.

The Nasa center is staffed with highly skilled technicians who are not connected with any specific user department. They are available to all, on a walk-in basis, to help chase down why a program bombed or why it took so much longer than the programmer had expected.

The service is free and confidential so there is no need for a programmer's manager to ever know that his worker turned to the center for help. By pooling the experience of the center's staff and of the users who go to it, the users may learn of facilities within the system or the language processors that they never would have found otherwise, Ramsay suggested.

Implementation of such a programmer assistance center would certainly require

use of software monitors, he went on, so he has definite thoughts about getting both hardware monitors and software monitoring packages even though he hasn't taken any definite action in that direction.

Functionally Ramsay's domain is a service center for other units within NBS. He has no programmers of his own nor does he have the right to even evaluate, much less modify, any program presented by an authorized user.

But the move to Exec 8 — essentially completed at the beginning of July — has left Ramsay with "many confounded problems" resulting from a lack of user training, a lack of training on the part of the systems staff and a lack of familiarization on the part of the operating staff.

The changeover began, he continued,

last December when free time was provided for conversion efforts.

The center started, in January, to use Exec 2 on the prime shift with Exec 8 available on late shift. Conversion in most cases did not require more than JCL changes.

As a number of programs got converted, the center started the prime shift with Exec 8, then shifted to Exec 2 about noon and "ping-ponged" through the day as the workloads for each system built up.

That approach continued for about three months and then became "completely intolerable," Ramsay said. On the first Monday of July, the center switched to Exec 8 with Exec 2 only on a time-available basis at the end of the 24-hour workday.

## MSR/2000 Puts Multiprogramming Onto Smaller Honeywell Systems

WALTHAM, Mass. — A new mass storage resident operating system introduced last week by Honeywell supports basic multiprogramming — with two concurrent job streams, plus two data transcription streams — on a minimum 40K character Model 2030 or 2030A CPU.

The MSR/2000 operating system schedules jobs, allocates peripheral devices for optimum use and flexibility, and provides dynamic memory management, allowing the user to change the size of the job streams and use inactive data transcription areas for job stream processing.

MSR/2000 is neither the first nor most powerful multiprogramming software for the 2030 user, but it does make support for dual operations available to smaller systems than before. The previously announced OS/2000 supports 10 job streams, but requires at least 49K charac-

ters of main storage.

Within the system, MSR/2000 coding takes between 5K and 7K characters. OS/2000, by contrast, requires 12K to 14K characters, a spokesman noted.

### 8K Partition

Under MSR/2000, each job stream requires a minimum variable partition of 8K characters, but these in effect are part of a single large partition under control of the memory management system. All memory beyond the basic needs of each job stream is available on a contention basis, he added.

The data transcription streams provide utility operations — card-to-tape, tape-to-printer, disk-to-card, etc. — independent of the application logic of the programs in the basic job streams. This means, the company said, that programs need not be delayed by the slow speeds of some I/O gear.

MSR/2000 supports up to 299M characters of disk storage, magnetic tape systems with transfer rates up to 149,300 char./sec, and communications equipment using binary synchronous code. It supports remote batch, remote job entry and transaction-oriented devices in addition to conventional I/O equipment.

The new operating system accepts programs written for Mod 1 and MSR environments and provides, at the same time, a compatible subset of OS/2000.

Cobol, Fortran and IBM-compatible RPG are among the languages that can be used. Programs may be written wholly in one language or made up of segments or modules in different languages.

The MSR/2000 software will be distributed free to 2030 or 2030A users, with deliveries to begin in the fourth quarter of 1973.

## Package Enhances CP/CMS Runs

CAMBRIDGE, Mass. — "Dramatic performance gains" on in-house or time-shared 360/67s can result from the use of a CP/CMS support package now available from Rational/Software, Inc. The package includes a loader, linkage editor, object deck binder and load module fetcher.

This software can be used on a user's own 67 or in connection with 67-based time-sharing services offered by such vendors as National CSS or Interactive Data Corp. It should also be compatible with installations using IBM's Virtual Machine facility (VM/370).

The current package, version 4.0 of software that has been in development and use for several years, "substantially implements the entire specification" of

the OS/360 linkage editor, level F, the company said, except that planned overlay modules cannot be produced.

Coded in F-level Assembly language, with extensive comments and user-defined conditional assembly options, these products are said to perform "quite well and with fewer bugs than existing programs." Used in a virtual environment, they have no residual memory requirements.

The package is available for a one-time license charge of under \$4,000, that covers its use on "any number of CPUs." Maintenance is available for an annual \$150 charge.

R/S is at P.O. Box 26, MIT Branch Post Office, 02139.

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## Two Systems Installed on GE T/S Network

### 'Wocom' Eases Work Planning

MOORESTOWN, N.J. — Industrial engineers can become more productive by running most of their clerical efforts through the Work Study on Computer (Wocom) system now available on the GE remote-computing network.

Developed by Science Management Corp., Wocom provides analysis and setting of work standards by either Work-Factor System or Methods-Time Measurement. The program is designed to free the engineer of the routine calculations needed in determining time standards for all kinds of manual and semi-creative job functions, the developer said.

Since the computer handles all the table-lookups and analysis that previously took much of the engineer's time, clerical employees trained in simple data entry operations will be able to handle many of the routine work study tasks. This in turn will free the engineer to apply his skills to more complex problems.

The data entry functions themselves are far simpler than those conventionally required in work study operations. Having defined the proposed workstation and the tools available, the task to be performed can be stated as easily as "assemble part A in part B" rather than as a series of specific body motions.

"Knowing" where the tools and the parts are in relation to the workstation, Wocom determines the motions required to accomplish the task most effec-

tively. Once it works out the best sequence of actions, the program prints out full details.

By repositioning the proposed location of various tools or parts, the engineer or his clerical assistant can develop alternate action sequences until they find the one that seems best for the given situation.

Other programs within the Wocom system can be used for balancing the workload along an entire production line, establishing employee learning times, or for regression analysis that assigns different weights to factors involved in determining the time required for a job.

The GE network headquartered in Bethesda, Md., stretches from Europe to Japan, so Wocom is available to international firms or to companies in any one of the areas served by GE.

### Global Marine Fleets Tracked

STAMFORD, Conn. — Marine shipping companies can gain better control over their fleets and respond quickly to changing conditions with the Voyage Reporting System developed by Marine Management Systems and installed on the GE Mark III time-sharing network.

With the new system, each vessel still reports its status daily to the nearest office of the fleet owning company.

At the branch, however, the data is entered into the GE network and becomes immediately available, along with stored data about the vessel and the ports and waterways through which it is to pass, to all company offices.

## One of the best things about the Bell System's Dataphone® 4800 service is the maintenance behind it.

This new solid state data set transmits at 4800 b.p.s. over basic, unconditioned, private-line facilities.

It has a 50 millisecond turnaround time that makes it suitable for multi-point or point-to-point systems.

And it offers convenient local and remote loop-back testing. Which means trouble can be readily isolated between your equipment or ours.

Perhaps even more important, the Bell System has what is called the Data Technical Support Team.

This team is made up of representatives from various levels



of the Bell System, from the local company to Bell Labs.

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## Data Briefs

### Sycor Adds TWX/Telex Link To 340 Intelligent Terminal

ANN ARBOR, Mich. — Sycor's Model 340 terminals can now be ordered with a TWX-compatible option that allows users with asynchronous communications direct access to the Western Union TWX and Telex service.

The option can be retrofitted to almost all installed 340s, a Sycor spokesman said.

The 340 user contacts any other TWX or Telex terminal by dialing the correct number and transmitting the information at 110 bit/sec.

The 340 TWX option can be purchased for \$600 or leased for \$20/mo, including maintenance, from the firm at 100 Phoenix Drive, 48104.

### Unit Tests Interfaces

SOUTH HACKENSACK, N.J. — Dataprobe is offering a series of portable test and trouble-shooting instruments to isolate interface problems between telephone modems and data terminals.

Called the Datasaker series, the units are designed to aid installation, field service and testing of data terminal systems. They allow access to each of the 25 wires in the standard interconnecting cable.

The EIA100 costs \$132.50 with delivery in two to three weeks from 290 Huyler St., 07606.

The 4014 costs \$8,450, and the 4015 costs \$8,950.

### GTE Adds Ascii Terminal

STAMFORD, Conn. — GTE Information Systems has brought out an Ascii conversational terminal "designed primarily for applications where input or output are formatted, and where fast printing and transmission speeds are required," according to the firm.

The IS/5741 operates in full-duplex mode at 300 bit/sec. Its impact printer performs at up to 30 char./sec and prints the full Ascii character set. The printer has a standard 132-character line, with 156 optional.

Rental for the IS/5741 starts at \$115/mo, including maintenance. Purchase price of the basic unit is \$3,995. Deliveries will begin in the fall from One Stamford Forum, 06904.

### Tektronix Has 'Really Big' CRTs

BEAVERTON, Ore. — Tektronix has come out with two 19 in. computer display terminals whose screens can contain up to 8,500 alphanumeric characters or one million graphic points.

Both the model 4014 and 4015 print the full Ascii character set and the Model 4015 also prints the full APL set.

Deliveries will begin in the second quarter of 1974 from the firm at P.O. Box 500, 97005.

## ITT Plans Specialized Carrier Net

By Ronald A. Frank  
Of the CW Staff

NEW YORK — International Telephone & Telegraph Co. has filed a proposal with the Federal Communications Commission to provide specialized common carrier services to small- and medium-size data and other users.

Using the Houston-to-New York right of way of the Transcontinental Gas Pipe Line Corp. (Transco), ITT plans to build 59 microwave towers along the 1,500 mile route. Service to data and voice customers will be provided to customers on spurs covering up to 100 miles on either side of the main backbone route, the firm said.

The new services will be provided by United States Transmission Systems, Inc. (USTS), an ITT subsidiary. Service will be provided along a route from Houston through Atlanta, Washington and Philadelphia to New York and will be primarily aimed at the small busi-

ness user who is unable to take advantage of bulk-circuit discounts offered by AT&T and other carriers, a spokesman noted.

The proposed system will provide 1,800 channels in the six GHz frequency band with a target start-up date of 1975. Data services would be provided at 13 proposed speeds ranging from 75 bit/sec to 960 kbit/sec and at proposed rates ranging from 20 cent/mile to \$80/mile/mo.

Under a planned "liberal interconnection" policy either carrier- or customer-provided equipment will be allowed on the system. Specific details will be established when a tariff is filed, ITT said.

Among the service features being proposed are part-time usage of circuits, shared usage under which a group of users share facilities, carrier-provided multiplexing and the future

possibility of an all-digital switched offering.

USTS has said it will provide users with a data error rate of one in 10 million. This will be considerably better than the circuits now available to users, a spokesman said. But the new carrier will still have to depend on local-loop facilities from existing carriers, the spokesman admitted.

This means the error rate achieved on the USTS system would still have to be averaged in with the local facilities connected to user sites.

ITT is classified as an international common carrier and as such it could be restricted from providing domestic services under FCC regulations. The application filed with the commission covers only the construction of the proposed system. Actual charges to users will have to be set forth in a later tariff filing.

## Data Terminals Aid Hospital Records

Data input terminals are helping to speed patient record-keeping in hospitals at both the University of Pennsylvania and the State University in New York. They are being used to cut down the time needed to process vital information.

At the University of Pennsylvania Hospital, NCR 280 point-of-transaction terminals capture outpatient information. The terminal calculates charges and stores financial and statistical data on magnetic tape for later input into a mainframe system.

Each patient's visit is recorded the minute an appointment slip is presented to a terminal operator. The patient is assigned a record number and a plastic ID card which is used to validate his data when it is being entered into one of the terminals.

The terminal operator/cashier enters a two-part service record ticket into the 280's printer and then enters each transaction that applies to the patient.

The service record travels with the patient during his visit and the proper entries are made as treatments are given. All records entered into the 280 are also entered into an NCR 723 data collector. The data entered from four 280 terminals is recorded on mag tape and removed each day for entry into the hospital's CPU.

At the New York State University Hospital, the Total Hospital Operating and Medical Information System (Thomis) handles admissions. Running on a 360/40, the software system contains provisions that enable operators with IBM 2260 CRTs to get vital patient information when required.

Data on admissions is entered into the Model 40 on a preadmission basis. This is done, where possible, before a patient reaches the hospital, often by phone.

When the person reports to the hospital, all vital information can be printed out on IBM 1053 teleprinters or on a 2260 as

required. Emergency admissions are handled in real time on one of the terminals.

At both hospitals, accurate data on the amount of patients being treated, together with a record of services performed, has allowed the institutions to monitor trends that were not apparent before.

### FCC Hits N.C. Plan

WASHINGTON, D.C. — The Federal Communications Commission has told the North Carolina Utilities Commission that its proposal to eliminate the interconnection of intrastate non-carrier equipment [CW, July 25] could require "a major restructuring of intrastate and interstate service offerings and tariffs."

In a letter to the state commission, Bernard Strassburg, chief of the FCC's common carrier bureau, said "all subscribers... are accorded the right to interconnect their own equipment" to network facilities which are commonly used for both interstate and intrastate services. Any carrier "failing or refusing to permit such interconnection... would be in violation of the Communications Act," the FCC official said.

The letter called attention to the joint board composed of FCC members and representatives of the National Association of Regulatory Utility Commissioners (Naruc). This cooperative venture between federal and state regulatory bodies is working with the interconnection problem, the letter said, and any "unilateral proceeding" by North Carolina would result in "derogation" of these efforts.

## DEC Offers Data Interface

MAYNARD, Mass. — A 16-line asynchronous communications interface has been introduced by DEC for its PDP-11 series.

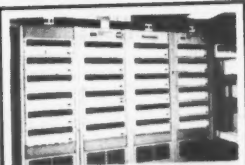
Called the DH11, the interface handles 14 data transmission speeds up to 9,600 bit/sec under user-generated software control. The interface has a 64-character buffer and features direct access from memory to transmission line to cut software overhead.

The interface is flexible to handle most types of terminal protocols including 1, 1.5 or 2 stop bits, 5- through 8-bit character sizes, odd, even or no parity mode, and full- or half-duplex operation.

Asymmetrical transmission for optimizing CRT operations can be handled by the interface. Using this type of scheme, the user can write software that will allow slow-speed keyboard-generated input to the PDP-11 with higher-speed output from the processor to the CPU.

The DH11 is compatible with the DEC DF11 BA and BB asynchronous modems.

The DH11 without line adapters costs \$4,400. A configuration with line adapters for 16 terminals operating in local mode will cost about \$330/line, DEC said. A private line system with 16 remote terminals costs \$353/line.



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Vadic's powerful built-in diagnostics such as remote loopback tests are particularly useful since OTB servicemen can quickly isolate a problem to the terminal, the network, the computer interface or the modem.  
This ability to rapidly troubleshoot a faulty channel is very important since Off-Track-Betting has a daily sales volume greater than Macys or Gimbels - and just can't afford lengthy downtime.  
P.S. Who's Vadic? They've delivered over 20,000 modems to date.

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Vadic Bell 1100 type modem modules, modem modules on PC boards, 1100 baud and 1200 baud modems, 1100 baud and 1200 baud modems, 1100 baud and 1200 baud modems, 1100 baud and 1200 baud modems.



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## Transmits at 1,800 Bit/Sec

# Fairchild Introduces Teletype Buffer

CW West Coast Bureau  
SUNNYVALE, Calif. — Fairchild Camera and Instrument Corp. has introduced a teletypewriter terminal buffer (TTB) designed to accumulate messages for later transmission at a faster speed to produce savings of up to 92% in transmission time, according to the firm.

The TTB is the first product of Fairchild Communications Equipment, a new division which will produce a line of communications devices and memory products.

Because the teletypewriter has been severely limited by its lack of high-speed transmission capability, the TTB acts as a link, accepting the slow output of the teletypewriter and feeding it at high speed to the communications network, the company said.

The TTB permits messages to be typed into the buffer and then fed to the line at speeds up to 1,800 bit/sec or 180 char./

sec instead of the normal TTY speed of 10 char./sec without the buffer.

### Buffer Permits Editing

While data is in the buffer, an editing capability permits the data to be altered, deleted or searched for any character, line or file, using paper tape.

A reverse channel feature verifies that transmitted data is being received. Accumulated messages may also be transmitted automatically during off hours.

The TTB is available in two models — TTB-8, which stores 8,000 characters and TTB-16, which stores 16,000 characters.

Each is compatible with teletypewriter Models 33, 35, 37 and 38 as well as other TTY terminals. Each TTB model operates with most modems and transmission speed combinations, the company said.

An option permits tabular data to be compressed by omitting blank spaces. Data compression can reduce transmission

time by as much as 80%, Fairchild said.

Preset formats can be stored in the TTB to allow an operator to interact on a line-by-line basis. Other options include teletypewriter parity checking, a low- and out-of-paper alarm, automatic teletypewriter motor control and transmission blocking.

Both TTB models are fully compatible with IBM 3704, 3705 communications processors. The IBM 270X can also be adapted, using the Teletype 4210 tape system.

The TTB is packaged as a free-standing unit with its own power supply. It may be mounted on the back or the side of the TTY.

Unit prices of the TTB-8 and TTB-16 are \$1,600 and \$2,200, respectively. Lease price for the TTB-8 is \$63/mo and \$86/mo for the TTB-16. Delivery is 60 days from 510 Pastoria Ave., 94086.

## CRT Inputs to Mini For N/C Operations

BEDFORD, Mass. — "It makes sense, if you're going to communicate with a computer, to communicate through a CRT terminal. It gives you more power and versatility of display," said M. Darrell Briggs, general manager of Machine Control Corp.

Following his own advice, Briggs has replaced Nixie and etched message readouts with a video display in the firm's Computer 1020L N/C controller.

The biggest problem with conventional readout systems in N/C equipment has been the massive amounts of hardware and wiring needed to interface with the computer, Briggs said.

By using video display, Briggs stated, engineers have been able to take 12 or 16 possible switch arrays, code them, and bring back only eight or nine wires to the computer, resulting in a neater and less expensive installation.

The CRTs Briggs uses are made by Ann Arbor Terminals Inc. including the firm's Model R0206A display controller, and are connected to DEC PDP-8E minicomputer.

### CRT Reacts to Tools

Data displayed on the CRT is updated when a tool pauses or stops, because the position of the tool is often changing faster than the CRT can respond. For example, a printed circuit board drill controller changes the drill's position at a pulse rate upwards to 100 KHz, 100 times faster than the CRT can react.

"We've adopted the philosophy of showing data only when it is correct," Briggs said. "Rather than update data on the fly, we update feeds, speeds, tools, effects, etc. on a block-by-block basis. Faster CRTs operating at MHz rates could be used, but we would lose the cursor address capability, a feature which is desirable for program debugging. There are also burst load CRT controllers, but they require that a one-for-one image of the screen be maintained in the computer's memory," he noted.

Commands such as feeds, speeds and overrides are entered using the keyboard. Tooling information (such as part number) is also entered through the keyboard.

Any operating instructions necessary for setting up the machine or for running a particular part can be entered by putting a header on the tape, Briggs said.

The controller is also capable of calling up a parts program listing from main memory to see what programs are available.

With video display, all data is displayed in standard English with both data and data format under software control. An added advantage is that it is no longer necessary to reduce information to permanent mnemonics or abbreviations to fit it into a limited conventional display format, Briggs said.

## Guide to British Data Services To Be Published

RAMSEY, N.J. — The Center for Communications Management will publish a guide to data transmission services in the United Kingdom.

The 350-page report will cover current and planned services and equipment in the U.K. It will also include information on technical interface specifications, equipment "type" approval requirements, rate schedules and other reference data.

The report will also go into data communication services between the U.K. and Europe, and between the U.K. and U.S. and explain how to calculate private line charges within the U.K., including a pricing matrix for the top 40 cities.

There will also be an examination of the experimental digital data networks and associated digital data services.

The report costs \$375 for orders sent before Aug. 1, and \$395 thereafter.

The Center for Communications Management is at P.O. Box 324, 07446

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\*Basic 8KB Model 74 list.  
With OEM discount, quantity of 61 — \$2,160.



## Bits & Pieces

### 360/67 Memory Doubles Capacity, Keeps IBM Specs

CONCORD, Mass. — A new add-on main memory system for the IBM 360/67 is expandable from a minimum of 356K bytes to a maximum of 2M bytes of main storage.

Expansion increments for the 360/Core 67 system duplicate exactly IBM-supplied memory for the Model 67 Mod 1 processors up to 1M byte of storage — the maximum limit IBM offers with that computer model, according to a spokesman for Cambridge Memories.

Beyond 1M-byte capacity, Cambridge offers expansion in up to four 262K-byte modules.

The first installation is presently at Brown University, Providence, R.I., where a 524K-byte memory unit is incorporated into the university's time-sharing service.

Purchase and lease prices vary depending upon the sector size, address level to which it connects and processor model. However, an average 262K-byte unit leases for around \$3,600/mo on a three-year term from 696 Virginia Road, 01742.

### Plotter Is for Economy-Minded

TEWKSBURY, Mass. — Users who would like to have a flat-bed plotter, but do not want to pay for a large system, can obtain Wang Laboratories' 732 Digital Flat Bed Plotter.

The 732 is driven by the firm's Model 700 programmable calculator to produce continuous line- or points-plotting graphics of curves and data of problems solved on the calculator.

To interface the plotter users must obtain the Model 708 Extended Memory Controller and necessary software (priced at \$3,100).

Finished plots are titled, scaled and labeled on any type of paper including linen, vellum and mylar, using any of three types of drawing instruments — fiber tip, ball point or standard drafting pens, the firm's spokesman said.

Cost of the 732 is around \$6,600 from 836 North Street, 01876.

### Microdata 1600 Disk Space Raised

IRVINE, Calif. — Storage capacities of 2.5M bytes (single drive with removable cartridge) up to 40M bytes (four disks daisy-chained using double-density track spacing) are available to Microdata 1600 series computer users.

Each new disk storage subsystem consists of disk drive(s), a controller, DMA multiplexer, power supplies, interconnecting cables and mounting hardware.

Price for the 2.5M-byte system is \$8,500 with the 40M-byte system selling for \$26,875 from 17481 Red Hill Ave., 92705.

## Microprogramming Unmasked — Part I

# Software-Type Approach Basic to Use

By Ira Gabbert

Special to Computerworld

Microprogramming is a means of implementing instructions of a digital computer using a software-type approach instead of the conventional hardwired method.

In a hardwired approach, the programmer instructs the computer to perform some function such as a fetch or an add. This is the lowest level on which he can communicate with the machine. But for the computer to perform each of the programmer's instructions involves several

Microprogramming by its very nature creates all sorts of questions. This series is intended to answer some of those questions. The other part of this series will consider the advantages of microprogramming and recent advances.

lesser machine functions that must be performed in a prescribed sequence.

To govern the required sequencing needed to perform machine operations hardwired machines use clocking and a great deal of hardwired control logic.

### Separate Intervals

The clocking breaks time up into separate time intervals and through the control logic directs the hardware to perform subtask A during the first time period, subtask B during the second and so on until the instruction specified by the programmer is completed.

Using a microprogramming approach, individual instructions direct the hardware to perform each simple task such as moving the contents of a specified register onto a bus. Another instruction might direct another specified register to load the contents of the bus.

In this context, a complete microprogram made up of individual microinstructions directs the hardware to execute all functions needed to perform the original programmer instruction.

### Two Computers

One can then think of a microprogrammed computer as two computers: the stored program computer that the average programmer is involved with, and the microprocessor which takes his instructions, and does an appropriate program sequence to direct the hardware in effecting the original instruction.

The user-level programmer need not be, and well may not be, aware of the existence of the microprocessor. The microprogrammer, on the other hand, is almost always aware of the features of the user-level computer and the programming aspects of the microprocessor.

The microprocessor is a complete digital system in its own right. At the low end it is a single address, word-oriented machine. At the high end, it is a multi-

address machine with 8-bit byte or 4-bit digit manipulating capability and word-handling capability.

The microprocessor has its own memory (control store) from which to extract the microinstructions needed to perform each specified user-level instruction. (This control store may or may not be alterable by the microprocessor.)

Further, the microprocessor has registers, arithmetic and logical data manipulation capabilities, communications with I/O devices and some capability to react to external and internal interrupts.

The advantages of using microprograms to drive the hardware instead of hardwired logic are cost, versatility and, in many cases, speed.

In terms of cost, it is easier to produce the microprocessor than to produce the clocking and control logic. Versatility is realized as users can create (or obtain) new instructions for their machines simply by coding in the sequence of actual events necessary to reach the de-

sired goal.

An example of this versatility might be in a square root operation. For the amount of time that a computer user actually needs a square root operation performed it is not cost/effective to include the needed control logic in the standard computer.

On the other hand, the microprogrammable computer can have a program economically stored and waiting in its control store memory for this function.

Speed is realized as in some standard hardwired operations an instruction is performed in fewer sub-time intervals. For example, a hardwired machine may wait through unused time periods until the next significant clocking period occurs.

With microprogramming the machine performs only as many microinstructions as are required to complete a task.

Ira Gabbert is a senior microprogrammer on the technical staff of Interdata, Inc.

## Expanded Key-Disk System Offers More Storage, Bundled Software

SANTA MONICA, Calif. — Computer Machinery Corp. (CMC) has developed a new key-to-disk system that falls into the mid-range of the firm's data entry systems.

The CMC 12 system also bundles many software packages that previously were optional at extra cost on the CMC 9 key-to-disk system.

The expanded disk subsystem has a storage capacity of 11.2M characters (6-bit character) which is double the 5.6M character capacity of the CMC 9 system. In terms of records, the CMC 12 disk subsystem can store 109K records — up to 112 character records.

### Intermixing Displays

The use of video display keystations as well as panel display keystations allows



Users can mix up to 32 video display or panel display keystations in one CMC 12 key-to-disk data entry system.

the user to choose and intermix types of displays in the same system up to a total of 32 keystations.

The CMC 12 can automatically transfer record batches from disk to tape and automatically execute frequently used procedures.

The Telebatch data communications system permits batches of records to be sent to another Keyprocessing system or to a host computer over public or private transmission lines.

An optional Telebatch system permits a CMC 12 system to serve as a communications terminal for remote control of the entry of jobs into the host mainframe and the printing of reports processed by the mainframe.

### All the Hardware

Hardware configuration for the system consists of keystations, a console which includes a built-in central processor with a 20K-word memory and a cycle time of 1.2 msec, magnetic tape unit and a stand-alone disk drive with removable disk pack storage, a teleprinter and system software.

A second magnetic tape unit can be added for extra recording capability. Two line printers (80 column, 356 line/min or 132 column, 245 line/min) are available for producing listings and management reports.

A typical 17-keystation system leases for \$2,690/mo, including maintenance, on a one-year lease. This same system costs \$119,600 from the firm at 100 Wilshire Blvd., 90401.

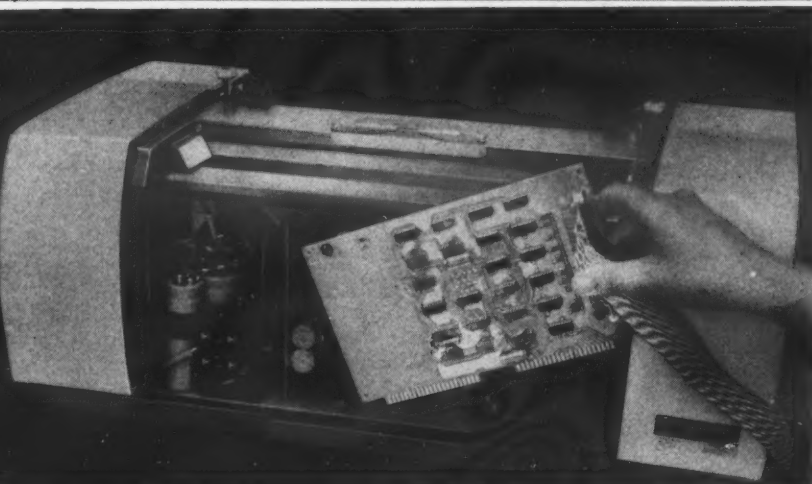
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## Capacity Attractive, Report Finds

# Want to Buy a Used Machine? '360/40's Best Bet'

By Toni Wiseman  
Of the CW Staff

ELMSFORD, N.Y. — After eight years in the marketplace, the 360/40 has at last achieved the status of "best buy," because of its current bargain price in the used computer market.

There have always been price differences between the 360/30 and the 360/40, but the current differences are based on capacity, not relative desirability of the two systems. This, according to Time Brokers, Inc., which issued the status report on the 360/40, is the primary factor which has placed the model at the top of the best-buy list.

"The 360/30 used to be the big thing," the report said, "but now the companies are outgrowing the machine's capacity. They have two choices — to go to a 135 or a 360/40."

Other reasons for the 360/40's current status reflect the problem of supply and

demand.

Demand for the 360/40 has been weak for a number of years. Inflation concern, high interest rates and the general state of the economy have all contributed to the lack of demand in past years, according to the report.

This lack of demand has resulted in increased availability. The supply has also increased as a result of the recent growth in the number of shops installing 135s and 145s, TBI reported.

The increased sales activity in the 360/40 area is expected to continue over the next quarter as more companies become aware of the situation.

"Last summer the economy was up for a period and 360/40 prices jumped from \$175,000 to \$220,000 with increased demand," the report continued. "Now, with Watergate and everything, the price is down almost \$100,000."

For example a 360/40 65K system with

a list price of \$669,350, today has an asking price of \$290,000, or 43% of list. A 360/40 131K CPU is going for \$165,000 or 45% of list price, TBI noted.

### I/O Sets

Supply and demand has also affected the price of I/O sets, but not favorably as in the case of the 360/40.

Two years ago, the price for an I/O set was \$75,000 to \$78,000, a sum which was, in TBI's opinion, out of proportion with the price of a used CPU.

The price is still out of proportion today, according to TBI, but the market price today would be \$85,000 to \$88,000 for a 2821 control unit, an N1 1,100 line/min printer and a 2540 reader punch.

Although a company would have had a \$10,000 profit had it purchased an I/O set two years ago (plus having been able to use the equipment for two years for a monthly maintenance charge of about

\$350), and although the market price of I/O sets still has about \$5,000 to rise before it hits its ceiling, TBI said it would not encourage a company to invest now.

"I/O sets are six to seven years old now," the report said, "and I wouldn't invest in one unless I were sure of using it for five years."

Time Brokers, Inc. headquarters are at 500 Executive Blvd., Elmsford, N.Y. 10523.

## Graphics Terminal Designed for Use On Cyber, 6000 Series

MINNEAPOLIS — CDC users with manufacturing applications can obtain an interactive graphics terminal system from Control Data.

The on-line data entry/display Cyber Graphics Terminal is designed for use as a remote engineering graphics station to a CDC Cyber 70 series or a 6000 series computer.

Computer-generated data — graphic and alphanumeric — is shown on the console's round, 24-in. display screen. Using this data, an engineer can enter new and modify existing information with the terminal's keyboard or a hand-held light pen.

The light pen enables the user to trace the outline of a geometric figure or electronic circuit, changing specific elements as he progresses.

Changes so entered are automatically stored in the host computer's main memory so the most recent design or text information can be called up for display at any time.

The associated controller contains terminal controls, maintains the display file and handles communications with the central computer.

Up to three graphics consoles may optionally be attached to one controller.

If the user desires, the graphics subsystem can be configured to act as a remote job entry station with the addition of optional peripheral equipment.

### Operating Software

Operating software at the host computer includes CDC's Scope 3.4/Intercom operating system. The interactive graphics system (IGS) portion of the software package includes graphics utility, graphics interface, applications executive and data handler routines.

Mainframe software is designed so that a user can write his own supplemental programs in Fortran. Also, a library of subroutines provides access to the graphics hardware without limiting applications or data structures.

Basic configuration of the Cyber Graphics Terminal subsystem consists of a single display console, programmable controller with up to 25K words (18-bit word) of memory, communications adapter, magnetic tape cassette and terminal "controlware." Controller memory is expandable to 33K words.

The console keyboard contains 10 function keys, 16 mathematical keys and 96 alphanumeric keys. Display refresh rate is up to 50 frame/sec; at 30 frame/sec screen capacity is either 11,400 characters, 20,900 eight-inch lines or 10,000 points.

One of the first major applications for the graphics system, according to CDC personnel, will be in the automotive industry with present proposals directed toward the Ford Motor Co.

Purchase price for the basic system is \$120,000 with a lease price of \$3,000/mo, excluding maintenance, over a one-year term.

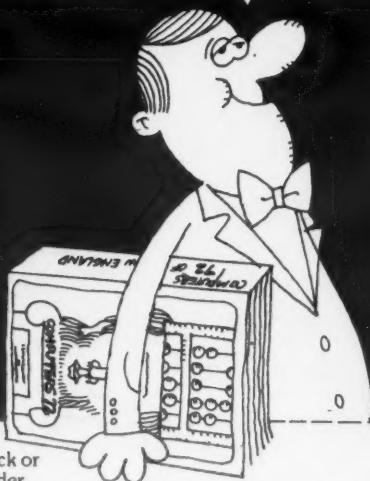
System availability is scheduled for the first quarter of 1974.

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## Social Change Session Gets Quick DP Lesson

By Graham F. Wallace

Special to Computerworld

STANFORD, Calif. — Registrants at a conference here of counter-culture groups exploring social alternatives and problems of social change used an interactive information retrieval system to learn the backgrounds of fellow registrants while the conference was in progress.

A data base was created early in the three-day meeting from forms filled out by more than 200 attendees. Each person specified several key words that identified his interests and activities. He also supplied up to 100 words of text describing himself.

To make an inquiry a person defined a topic of interest in terms of one or more

key words. His inquiry was typed at a teletypewriter terminal and transmitted via telephone lines to a timesharing computer center in San Francisco.

Within a few seconds he received descriptive information on other registrants interested in the topic. He could then sharpen his inquiry by specifying additional key words and inquire again.

When one person inquired for people interested in technology, the response identified 41 people. When he then inquired for people interested in both technology and apprenticeships, the response identified three people.

The retrieval system was provided and operated by Resource One, a non-profit community computer center in San Francisco.

The purpose of the demonstration, said Lee Felsenstein of Resource One, was to make people more aware of computers as a resource available to them, and to dispel some of the mystery surrounding computers in many people's minds.

## Keypunchers, Unite

SYDNEY, Australia — With its U.S. counterparts working on certification, job evaluation testing and motivation by objective as a means to increase DP personnel production, one keypunching firm here has reportedly quintupled production in the first week by moving in the opposite direction.

Instead of trying to build a controlled environment, Bob McIntosh of Key Tape Data Processing dropped all regulations for his keypunchers.

"We know how to deal with people," McIntosh said in an interview with the *Australian Computer Weekly* magazine. "They are well paid. They make about \$100 a week net. There are no rules and regulations.

"It's easy for people to abuse a system like that, but there has been no abuse because the girls are treated like humans," he added.

## Past Holds Key to Ending Erosion

CORVALLIS, Ore. — The simulation of past erosion patterns may be the answer to preventing future mishaps along coastal areas.

Dr. Paul D. Komar, assistant professor of oceanography at Oregon State University, has developed a program which simulates sediment movement along beaches, depicting erosion and deposit patterns.

Komar is trying to reconstruct the erosion which occurred at Bay Ocean sand spit, in northern Oregon, erosion which began when a jetty was built in 1910 and resulted in the collapse of the spit in 1952.

An erosion history was constructed from old charts, photographs, surveys of the area, and Corps of Engineers data. This was fed into a CDC 3600 along with the "end result" or current topography, according to Komar.

The program divides the beach into small squares and lets the sand move from

one square to the next using equations of sand transport along beaches, under waves and currents, in little increments of time.

Though Komar is presently "predicting" the past, he feels his findings will be valuable in the future. "If the program proves to be able to predict what must have happened in the past," Komar said, "I can then use it to predict the effects of jetties that might be built in the future, or of any other man-made alterations along the shoreline."

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and ask for Ron Bentley or call the  
WANGCO office nearest you.

## Model Gives State Good Look at Itself

By Toni Wiseman

Of the CW Staff

TUSCON, Ariz. — Computers are lending more than just moral support to some government officials here faced with difficult policy decisions.

Atom — Arizona Trade-Off Model — has been programmed to aid county supervisors in making and justifying land development rezoning decisions.

The computer won't make a final decision, but it will supply information on all the economic and environmental implications associated with a proposed land development, including the number of people and services the new industry will support, its economic contribution to the community and its ecological effects.

"The model," said Harry J. Plumlee of the state's economic planning department, "can project population, migration, export activities and so forth in five-year increments by county up to the year 2000."

The program itself was prepared by the Battelle Memorial Institute, of Columbus, Ohio, and will be fed into the computer at the University of Arizona's Data Programming Center.

"Atom is designed to provide useful information to public officials who are responsible for making policy decisions," said C.W. Myers, Arizona Department of Economic Planning and Development director. "It is not designed to make that decision by describing some optimum solution."

## Have We Got a Scholarship!

NEW YORK — High school students who thought they did not qualify scholastically for educational financial aid are discovering thousands of dollars worth of possibilities through Scholarship Search Corp., which has fed data on over 250,000 available scholarships, fellowships, loans and grants into a computer.

S. Robert Freede, president of Scholarship Search, said the amount of unused money set aside for scholarship purposes is said to go into the millions of dollars.

"Often the requirements for such aid have nothing to do with scholastic achievement," said Freede. "We have in our files many awards that are available to veterans and to the average student."

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# NSF Backs ACM-Wharton Meeting

PHILADELPHIA — A limited-attendance conference now being planned for late October will provide researchers from various academic disciplines an opportunity to tie together approaches on improving the design of computer systems for organizations.

Both organizational and technical factors will be considered, according to program chairman Prof. Howard L. Morgan of the

Special Interest Group on Business DP (SIGBDP) and the Computer and Information Systems Division of the American Institute of Industrial Engineers.

The meeting is partially supported by a grant from the National Science Foundation and

should give workers from such diverse fields as computer science, psychology, management and operations research a means to "communicate and interact with one another," Morgan said.

Attendance will be limited to 50 invited participants.

# System Buildup, Control Covered by AMA Seminar

NEW YORK — Managers both in and out of DP can gain insight into how systems are developed, implemented and evaluated, by attending a five-day Advanced Systems and Procedures course being offered by the American Management Association.

This course appears to be somewhat different from others, since it will spend at least some

time considering whether or not a computer should be used for a given project.

Chaired by John N. Petroff, who heads MIS operations for Theodore Hamm Co., St. Paul, Minn., it will be presented at three different cities, starting in Atlanta, at the Hilton Inn, in mid-September. Later it will move to the AMA Management Center, Chicago, in October, and on to AMA headquarters, here in New York, in December.

The course outline ranges from concepts and techniques of system management, through planning and analysis of present and proposed systems, and including recruitment, selection and training of systems personnel.

While the course focuses primarily on developing systems, it will spend some time considering performance evaluation.

Fee for the Advanced Systems and Procedures Course (#6505) is \$465 for AMA members and \$535 for non-members, a spokesman said from association offices at 135 W. 50th St., 10020.

## Education

Wharton School, University of Pennsylvania.

The First Conference on Research on Computers in Organizations will be held at Wharton on Oct. 24-25. It will be co-sponsored by Wharton, ACM's

# Cause Confab Open to All

BOULDER, Colo. — The national conference of the College and University Systems Exchange (Cause), late this year, will focus on "a future look at information systems" in higher education.

The meeting will be held Dec. 10-12, 1973, at the Royal Sonesta Hotel in New Orleans. It is open to administrators from any college or university, regardless of whether their institution is a member of Cause, according to program chairman Dr. Robert Taylor of Virginia Polytechnic Institute.

Contributed papers on subjects

related to administrative information systems will be reproduced and made available at a "Cause Paper Fair" to be held during the conference.

The program committee will also invite papers on specific topics of current interest and these, also with certain of the contributed papers, will be presented formally at the meeting, Taylor noted.

Brief abstracts of papers which authors expect to contribute should be sent to Cause, 737 Twenty-Ninth St., 80303, before Oct. 1, he added.

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## The German Computer Caravan Schedule

Dusseldorf	Nov. 1-Nov. 3
Hamburg	Nov. 6-Nov. 8
Frankfurt	Nov. 13-Nov. 15
Berlin	Nov. 20-Nov. 22
Munich	Nov. 27-Nov. 30



# COMPUTER INDUSTRY

## CI Notes

### Wema Urges Trade Advice

PALO ALTO, Calif. — Industry associations should actively apprise their membership of the steps the government plans to take to assure adequate industry participation and feedback in the upcoming government tariff negotiations, according to the Western Electronics Manufacturers Association (Wema).

The computer industry, one of nine proposed industry categories, should be divided into three sectors — large computers, mini and sub-mini computers and computer peripherals — Wema suggested in a letter to the Secretary of Commerce.

Each category faces different tariff and non-tariff barriers and the peripheral sector is a recognized industry by itself, Wema explained. Also justifying the separation is the fact that minicomputers perform different (i.e., non-business) functions than large computers, Wema said.

### Honeywell Declines Calif. Bid

CW West Coast Bureau

SACRAMENTO, Calif. — The state may be stalemated in its search for bids for the Stephen P. Teale consolidated computer center.

Honeywell announced last week that it was dropping out of the running for the contract.

That leaves only IBM as likely to bid by the July 30 deadline, although the state said it was "continuing the bidding process."

A state official said that if only IBM bids then a legal decision will have to be made, since the state legislature has specified there must be at least two bidders and at least two different mainframes before a contract is awarded.

### Defendants Plead Not Guilty

CW West Coast Bureau

SAN JOSE, Calif. — The remaining defendants in the case involving theft of \$660 million in IBM trade secrets have pleaded not guilty in arraignments in municipal court.

Pleading not guilty were: Ramon Serata, Phillip Kronzer, Thomas A. Finnegan, Wolfgang Arnold, Brunhilde MacNevin, Thomas N. Rauscher and John F. Seuta.

Wesley G. Powers was reported living in Europe and had not been located.

### CDC Buys ITT Brazil Unit

RIO DE JANEIRO — Control Data Corp. has acquired the Brazilian data services operation of ITT, which will be known as Control Data do Brasil Computadoras, Ltda.

This marks another in a series of acquisitions in the services area made by CDC both domestically and abroad since acquiring Service Bureau Corp.

### Supershorts

Recognition Equipment has established a \$300,000 reserve against the contingency that total costs of developing a postal address-reading system for the French Government could exceed the \$2.8 million contract price. This reserve has been charged against operations for the third fiscal quarter.

Interdata, Inc. has shipped its first New Series Model 85, with Dynamic Control Store for user-alterable microprogramming, to the School of Architecture and Planning, MIT.

Iomec, Inc. has appointed D.G.S. Datagraphics, Ltd., Ottawa, to represent the full Iomec line throughout Canada.

Modular Computer Systems has named Teijin Advanced Products Corp. as its Japanese sales and service representative.

## Study Forecasts for 1982

# Data Entry Market to Reach \$4 Billion

By Molly Upton  
Of the CW Staff

NEW YORK — By 1982 the data entry market is expected to more than triple to \$4 billion annual sales from the current \$1.2 billion, according to a recent study by Frost & Sullivan, Inc., market researchers here.

Although DP installations are currently devoting 20% to 50% of their operating costs to data entry, about 80% of all users are still employing keypunch techniques.

This leaves a large growth market within the next 10 years, and the report found intelligent terminals and keyboard-to-storage units among the sectors showing the highest growth.

"Computer data entry is becoming a data processing system unto itself, acting as a filter for the larger, more powerful computer," the report continued.

However, many of the firms currently engaged in the area have entered the arena more on their "insights to the potential market rather than to user insistence."

By 1982, there will be six key manufacturers in the data entry market, all of them computer manufacturers, and many independent specialized companies, the report stated.

Frost & Sullivan foresees a sharp swing to decentralization. By 1975, over 80% of

data entry systems sold will be for remote entry, and by 1980, the figure will exceed 90%. During the 1970s about 25% to 40% of all cases will use remote data capture and mailing, with communications becoming stronger in the end of the decade, the report noted.

### Keypunch Market

Annual keypunch sales are expected to decline from their position of \$450 million in 1972 to \$180 million in 1976 and then \$110 million in 1982. By 1974, sales of keyboard-to-storage units, \$343.5 million, will exceed those for keypunch, \$300 million, with keyboard-to-storage sales reaching \$455.9 million in 1976 and \$570.5 million in 1982.

Annual sales of the 80-column keypunch will decline, from almost \$250 million in 1972 to \$75 million in 1976 and \$35 million by 1980, with key-to-disk systems the major reason for the decline, the report noted.

However, sales of the 96-column buffered keypunch are expected to increase for the next three or four years, reaching \$150 million in annual sales by 1976, and then declining.

By 1980, Frost & Sullivan expects only 20% of all data entry will be keypunch.

In the keyboard-to-storage sector of the market, the key-to-tape stand-alone

equipment has contributed the largest portion of sales, over one-third, but it will be surpassed this year by sales of key-to-disk and keyboard-to-storage terminals, the firm said.

Key-to-tape sales will peak in 1974 at \$90 million, decline to \$70 million by 1976 and reach \$18 million by 1982, the report predicted.

Keyboard-to-storage terminals represent the "most significant growth area, achieving \$231 million annual sales or approximately one-half of the total keyboard-to-storage sales by 1976 and \$335 million or 60% of total sales by 1982," the report observed.

### Intelligent Terminals

Also a contender in this area, the intelligent terminal, which currently holds a 50-50 split in sales with the standard terminal, by 1976 will have revenues of \$135 million contrasted with \$71 million for standard terminals, the report stated.

By 1980, the difference will be even larger, with \$240 million in sales for intelligent terminals versus \$75 million for the standard keyboard-to-storage terminal.

Key-to-disk systems annual sales will continue to rise to over \$85 million this year, \$155 million in 1976 and \$200 million by 1980, according to the report.

Along with this rise in sales, improved software will extend the key-to-disk system "beyond a replacement for keypunching."

By 1976, Frost & Sullivan predicted all key-to-disk systems will offer options enabling interfacing with other data entry systems, and it expected "over 60% of such systems sold to employ a multimedia version in 1982."

For instance, the keyboard/reader is expected to impact most heavily the key-to-disk sector, with the biggest seller being the document/reader/key-to-disk configuration, according to the study.

Sales of the keyboard/reader should grow from \$23 million this year to \$75 million by 1975 and \$186 million by 1980.

The alphanumeric display terminals market, currently about \$200 million, is expected to double by 1976 and triple to \$600 million by 1978, becoming the major time-sharing device as well as an on-line direct data entry device.

The optical reader market, shared by character, mark and bar code readers, currently stands at \$207 million and is expected to grow to \$361 million in 1976 and reach \$605 million by 1982.

## Greybook Report Cites Market Strategies of IBM Management

IBM profits are supreme is the message of a comprehensive IBM Greybook study, written only for the eyes of IBM management, outlining marketing strategy for the 370/135 [M135].

"The M135 marketing objective is to migrate as many of our leased M25 (360/25) and M30 (360/30) installations as possible during 1972 and 1973 and then encourage them to enlarge their S/370 in the mid-seventies by adding new applications, such as communications and more memory," IBM said in the report.

The Greybook became public during recent court proceedings. Columnist and consultant Alan Taylor has assembled some of the papers and annotated them, in a soon-to-be-published report.

Thus even as the Model 135 was publicly released in March 1971, IBM decided

### ANALYSIS

not to include "many key elements" of the total system package.

"These follow-on items," according to the report, "were left for later announcements either for strategic purposes or lack of currently available resources."

These enhancements were scheduled in the report to maximize the impact of the 370/135 with the end release contemplated being "the successor system to the M135, designated FS-O... assumed to have a 12/76 announcement and a 12/77 first customer shipment."

Thus with the objective set as moving all 360/25 and 360/30 users into the 370 line, the report goes on to explain a selling line to speed the conversion and outlines potential danger areas.

One particular danger could arise from making the 135 too good, or as the report stated: "A third risk to the forecast would be the M40 customer's decision to migrate to a M135 rather than a M145. In so doing, he could get a S/370 machine with the equivalent internal speed of a M50 and more memory without any increase in his monthly rental."

Other areas that might impede IBM from moving the Model 25 and 30 user into the 370 line are listed as:

- Dependence on new business.

Description	Announcement	First Customer
1403 Native Attachment	6/71	5/72
Model 20 Emulator (DOS)	9/71	6/72
Relocate	9/71	6/72
3210-2 Attachment	6/72	6/73
368K and 496K of Memory	12/72	12/73
Winchester Native Attachment	12/72	12/73
Scientific Accelerator	12/72	12/73
Real-Time Channel/Priority Interrupt	12/72	12/73

### Documented Follow-on Plan for the M135.

- Migrating leasing company M30s.
- T55 price level in relation to the M135.
- T55 memory price slope in relation to the M135.

(Continued on Page 23)

## Learson Belittles IBM Memos

By E. Drake Lundell Jr.

Of the CW Staff

WHITE PLAINS, N.Y. — The IBM strategy for dealing with embarrassing memos and task forces became clear here during the deposition proceedings of former Chairman T. Vincent Learson — embarrassing memos were written by incompetents and task forces were not very important in the corporate scheme of things, he indicated.

If memos are not significant or did not have any effect on decision-making, then IBM apparently hopes the judge will give them little weight in deciding the case, no matter how damaging the memos seem to the IBM cause.

Learson said market share statistics kept by IBM in its commercial analysis group were probably inaccurate in most cases and top IBM management would not rely on them.

Learson said that while the title of task forces "sounds formal," they were usually just a couple of guys getting together.

A memo on unbundling was introduced, and written by M.M. Simond, whom Learson had "never heard of in my life," obviously dismissing him from the decision-making process at IBM.

After the announcement of unbundling, he said, the sales force was "seeing ghosts everywhere" so "I give no credence to remarks made at this time."

Even the figures on customer satisfaction compiled by IBM had little meaning, according to Learson. They were compiled by the marketing department to measure its own performance, he said, so weren't very meaningful to "hardheaded businessmen."

Learson even knocked his own efforts at memo writing, indicating that some were written by M.M. Simond, whom organization and make sure they were on their toes.

For example, he said a memo he wrote to P.J. Rizzo, the chief financial officer in the firm, calling on IBM to raise the price of CPUs and lower the price on memories, was of this type.



## Iomec Eyes End-User Market

SANTA CLARA, Calif. — Iomec Inc., peripherals maker for minicomputers, is seeking to broaden its marketing to include end users as well as OEMs.

The move is a logical one, capitalizing on know-how that the firm has been developing for several years, according to Avery Blake, vice-president of marketing.

The firm found in the early days of its existence that it had to make controllers and interfaces to various minis in order to sell its disk drives, to make it easy for the OEM to plug Iomec's drive into their computers, Blake explained.

"We've expanded this now across our full peripheral product line, so that we have these adapters and controllers to give us plug-to-plug compatibility with minicomputers. We think we're the only peripherals manufacturer known basically for its electromechanical capability, that provides the full subsystem capability.

"As long as we have that plug-to-plug compatibility with minicomputers, we're going to offer it to the end user.

"Now we find ourselves competing with what people have formerly known as systems houses," he added. These firms, he noted, buy the peripherals and then fill this void by providing the adapters and controllers, etc., he said.

"Iomec plans to capitalize on the fact that it builds the drives and printers, has a storehouse of designs and a large inventory of designs in production, and has the

field service capability," Blake said.

In the various peripherals lines, he said he could think of several reasons why users would want to go directly to Iomec for peripherals rather than to the mainframe manufacturer.

"We're electromechanical specialists," he explained, and the products often offer more capacity in storage devices, better prices (especially if they're buying more than one) and performance.

Blake admitted many persons do have trouble remembering everything Iomec makes, as it has introduced several new products within the year, but "basically we're an OEM peripheral supplier, and we cover the waterfront on electro-mechanical and electromagnetic peripherals.

"Our new marketing effort is going to be geared right at the specific user. A matrix lists the peripherals by categories and also a range of minicomputers, so a PDP-11 user can learn that Iomec has a controller in production for every one of its peripherals," he explained.

## Contracts

Sanders Data Systems has received a \$13 million contract from the International Brotherhood of Teamsters for programmable terminals. The terminals will be used in the Teamsters Information Terminal and Accounting Network (Titan), which includes a large central computer, front-end computers and regional concentrators.

Brandon Applied Systems, Inc. has received a contract from the Southern California Edison Co., for the conversion of its Customer Accounting System and Meter Records System from Honeywell Argus to IBM 370 ANS-Cobol.

The General Services Administration has renewed its contract with Computer Sciences Corp. for use of the company's Infonet data network by 70 government agencies. The one-year renewal is expected to generate about \$11 million in revenue for the year.

The State of Pennsylvania has awarded a

contract to Autocomp, Inc. for the automation, data base management, photo-composition printing and distribution of amendments to the Pennsylvania code of administrative rules and regulations. The estimated value of the contract is \$2 million.

Computer Sciences Corp. has received a contract from the National Aeronautics and Space Administration to provide computer services support to the Simulator Computer System Branch at Ames Research Center, Mountain View, Calif. The contract is valued at \$6.7 million.

Raam Information Services Corp. will provide Century Industries Co. with an on-line accounts receivable factoring service.

American Management Systems Inc. has been retained by the American Geological Institute to design and operate a computer-based membership information and communications system.

## CMC Ponders Sale Of French Subsidiary

PARIS — Computer Machinery Corp. has agreed in principle to sell CMC France S.A., a wholly-owned subsidiary, to a group of French industrial and financial institutions.

If effected, the transaction would make CMC France a French-owned company, making it eligible for government funding for R&D as well as preferential status given to French companies for government procurements, observed President Thomas L. Ringer.

The sale would be for an undisclosed amount of cash, as well as a number of agreements, including technical assistance and reciprocal royalty bearing licenses to manufacture and market present and future products.

## Computeristics, Bank Unit Form DP Firm

BOSTON — Computeristics Inc. and a subsidiary of the First National Boston Corp. are forming a new firm, FBC, Inc. that will offer DP services to banks.

The services include lock box transmission, remote batch processing and on-site facilities management. The lock box service will provide editing and error-checking capabilities as well as consolidated transmission from corporate lock boxes.

Computeristics is the data processing subsidiary of Uniroyal, Inc.

## L.A. Police Get Grant For Dispatch, Data System

CW West Coast Bureau

LOS ANGELES — Federal funding of \$2 million has been authorized for a computerized dispatching and information system for the Los Angeles Police Department, the city announced.

The grant will finance the initial phase of what will eventually be an Emergency Command and Control Communication System (ECCCS) for the city.

The overall system will take eight years to complete and will cost an estimated \$40 million.

The initial funding will be used to outfit 200 of the department's 600 patrol cars with computer terminals and provide funds for additional research and administration.

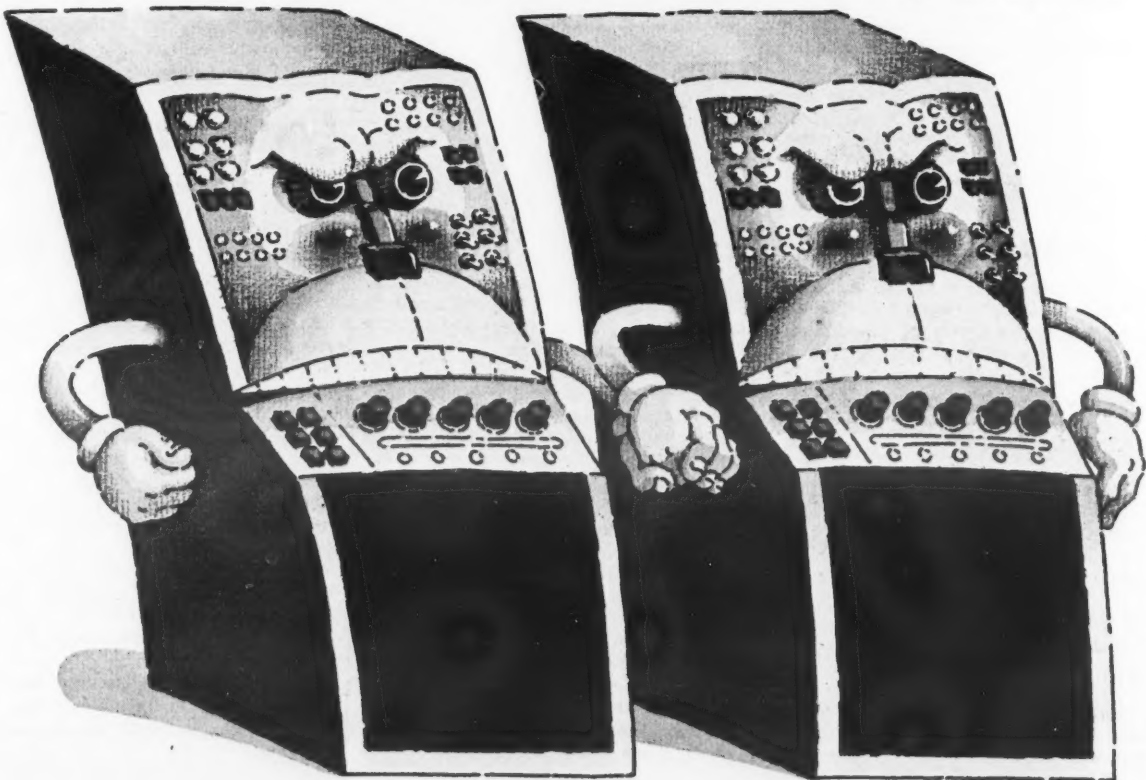
# Introducing "Scrooge-2"

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We have constructed an intra-active system consisting of a 360/67 for time-sharing that is hard-wired (and soft-linked) to a fast-response 360/75





# IBM Document Details Changing Systems Strategies

By E. Drake Lundell Jr.  
Of the CW Staff

TULSA, Okla. — "Significant changes" will take place during the IBM Systems Development Division's 1971 to 1978 strategic plan, according to a document released here as part of the IBM-Telex trial.

While the particular document in question mainly concerns the larger IBM systems, it gives an insight into the overall IBM CPU strategy over that seven-year period.

In the area of CPU trends there will be "more performance options in one CPU, but fewer unique designs."

Developments in the physical packaging area will permit more integration of functions than at present, including memory, channel and control units, the document indicated.

In memories, the cost will be lower and the minimum and maximum sizes will grow higher with fewer size options available to users during the next few years,

the plan stated.

The System 370 is helping move customers away from the 360 concepts, the report noted, by making Relocate a standard. Also significant are the death of OS (predicted for late next year), the growth of multiprocessing systems and emphasis on sensor base and data base applications.

At the same time, the report said there will be more emphasis on programmer productivity over the next several years.

## Total System Concept

In addition, the total system concept will play a larger part in the IBM development and marketing practices over the next few years and IBM will have to provide more applications work in order to meet the customer's problem-solving needs, the documents showed.

This all leads to the FS systems that are expected to be announced sometime in late 1975 to early 1976.

"Large Systems' objective will be to

lead the IBM company to a profitable FS offering for the top third of the product line (generally the market now served by the models 155, 165 and 195)," the document said.

In this effort, the plan indicated that "the emphasis (in architecture) will be on architectural accommodations to solve customer problems, rather than on increased speed.

"However, increased price/performance in native mode of approximately four times will support application development. Emulation mode of S/370 will be at approximately two times."

## Base Plan for FS

The base plan for the FS series recommends a large systems CPU "at a performance of 10 MIPS (million instructions per second), with symmetric multiprocessing up to N equals 4."

The system is scheduled for announcement in the first quarter of 1976 with first customer deliveries in the first quar-

ter of 1977, according to the strategic plan.

"This system will feature integrated channel function, integrated I/O control function and integrated memory," the plan added.

As an alternative to the base plan with its 10 MIPS processor, the plan noted that it would be studying a 6 MIPS processor to be announced concurrently with the rest of the FS line in July of 1975 for customer shipment one year later.

## Soviets Unveil Riad Series at Exhibit

MOSCOW — Six of the seven models in the Riad Series of computers were on display here at a recent Exhibition of Economic Achievements.

The largest model in the series, the ES 1060, is said to use LSI circuitry and is in the design stage.

The 1050, which is designed to handle 500,000 operation/sec, was displayed in a prototype form. The other machines are reportedly in production in the USSR and neighboring Eastern bloc countries.

Several of the about 150 peripheral devices being manufactured were also on view.

The machines include the ES 1010, made in Hungary; ES 1020, Russia and Bulgaria; ES 1021, Czechoslovakia; ES 1030, Poland and Russia; ES 1040, E. Germany; and the ES 1050, Russia.

## IBM Greybook Shows 370/135 Objectives

(Continued from Page 21)

- PCM (plug-compatible manufacturers) penetration of memory and I/O.
- Adverse economic conditions.

Throughout the report, outside manufacturers and leasing companies are treated as real while users are viewed merely as chips to be won or lost depending on the skill of IBM's sales force.

If users are the chips to be won or lost, IBM considers the other players in the game to be other mainframe builders, leasing companies and 360 enhancement builders.

As related to other mainframes, IBM felt its position was quite secure. The only real competition it saw was from the NCR-200 which reports characterized as bettering "the 135 in price at the low end but could not match it in performance, especially when Winchester became available."

To take care of the leasing companies the objective is apparently to stagger releases for two reasons: to make it harder for the leasing firms to keep up as IBM would know beforehand when the changes are coming and secondly to instill a feeling in users that it is unwise to sign for the longer leasing company machines and maybe miss some important new capability.

The outside peripheral and memory manufacturers created a different problem which IBM decided to attack in pricing.

"Since memory prices were fixed, however, only the price of the bare CPU could not be varied. Not surprisingly, the more price put on the CPU, the better its financial return. Since the basic CPU remains IBM's forte, its profitability was emphasized and high price encouraged."

A series of special Taylor publications, based on the Greybooks, will be available soon. The first volume will deal with the 370/135, while ensuing volumes will feature IBM information and Taylor comments on other individual members of the 370 and 360 families.

Information on the reports is available from Box RJ, Computerworld, 797 Washington St., Newtonville, Mass. 02160.

batch processing machine. We have formally designated this service as TS/RJE. Informally, we call it "Scrooge-2," for the way it carefully squeezes every dime you give it.

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Its prime benefit is running work in the batch environment which you would normally run in the time-sharing environment. In the past, it has been too much trouble to remove it from the time-sharing machine. By using Scrooge, you'll release your time-sharing equipment for more appropriate time-sharing work, yet get appropriately fast turnaround times on the batch work.

Not only does our new system pinch dollars but it lets you pinch them in four different ways as the chart indicates.

In addition, there is provision for information flow back and forth between machines, to and from batch terminals as well as interactive types. You can query status and/or cancel batch work. A powerful skeleton processor minimizes the OS job deck that must be stored in an on-line file.

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- (2) You can hook up your own time-sharing 360 to our batch 360/75. Your data processing costs should drop sharply, as you now enter each job into the most appropriate environment.
- (3) You can hook up your own batch-processing 360 to our time-sharing 360/67. You'll get time-sharing response on these priority development jobs, while maintaining a cost-effective operational level.
- (4) You can use Scrooge for program development, getting as much as a four-to-one reduction in program development cost.

## Grumman Data Systems

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## European Telecommunications Needs Common Market Approach: Layton

BRUSSELS, Belgium — The European nations should draw up plans for a European Telecommunications Corp. to oversee the development of a European network, according to Christopher Layton, director for advanced technology industries in the European communities.

"At present, the common market in telecommunications does not exist," he told the Federation of Telecommunications Engineers of the European Community.

"If in the new era of digital communications and electronic telephone exchanges, we persist in going our separate ways, the divisions will be even greater, the waste of resources and irritations for the consumer in 10 years time more grave than ever," he warned.

The European Telecommunications Corp. would be empowered to draw up a long-term plan for development of a European system, and to choose a "common or compatible European technology for the next genera-

tion of electronic telephone exchanges."

In addition, the unit would "administer and manage, if necessary, certain joint functions particularly of an international character, for instance the 'spinal column' of the European network, a common regional satellite, the provision, maintenance and responsibility for international data links," he recommended.

The unit would also develop common standards and represent the European telecommunications administrations in key international negotiations such as Intelsat.

This plan, he said, would make possible the creation "of a true common market and give European industry a strong base from which to attack the markets of the world."

### Position Announcements

#### ASSOCIATE FIELD ENGINEER

Tele/Resources, Inc., a fast growing electronics communications company has field service openings in the New York tri-state area.

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City of Lincoln, Nebraska is seeking experienced candidates for project management work in systems research and design. Applicants should have qualified DP experience including programming. Primary emphasis of position will be on Data Base Design and Management Information System Techniques. Send resume to:

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We're looking for a candidate for systems analysis and integration. To qualify you must have 5 to 7 years of heavy systems analysis and assembly language programming experience on minicomputers or microprocessors. BS in EDP or Business is also highly desirable.

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Several important positions exist for Systems Programmers who have heavy assembly language experience in minicomputers or microprocessors. There are openings for both junior and senior level candidates. Degree in computer science or related field preferred.

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Many key positions exist now for Diagnostic Programmers. To qualify you must have related experience in minicomputer field with a heavy assembly language background. Junior positions are also available for recent computer science or math graduates who desire a challenging career start.

#### Software Writer

We need a competent Software Writer who has 3 to 5 years of experience in producing software documentation for the end user of sophisticated computer systems. Computer Science, English or Journalism degree is also highly desired but not a requirement.

Now is the time to advance your career. All inquiries will be kept confidential. Direct your resume including salary history/requirements to Mr. Jim Boyer, Professional Employment Representative, Singer Business Machines, 2350 Washington Avenue, San Leandro, California 94577. We are proud to be an equal opportunity employer, m/f.

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### Orders & Installations

Broker's Data Services Inc., Los Angeles, has ordered a Univac 9700 as a replacement for a Univac 70/6, for use in brokerage accounting and other applications.

The City of Bridgeport, Conn., has purchased an IBM 370/145, to provide service to taxpayers and aid in collecting delinquent taxes and interest.

American Bancservice Corp., Riviera Beach, Fla., is installing two NCR Century systems as the nucleus of a central information file. The Century 200 and 101 will provide DP services to subscriber banks.

MIT's School of Architecture and Planning has installed the first New Series Model 85 minicomputer from Interdata, Inc. The unit will be used to refresh Raster displays in connection with contract work for the U.S. Navy.

Dallas County, in conjunction with the North Central Texas Council of Governments and the Texas Criminal Justice Council, has installed a Telecontroller data communications system from Action Communications Systems, Inc., for use in a message switching system.

Mobil Exploration Services Center has purchased a graphics computer system from Varian. The system, which has been installed on Mobil's research vessel, consists of a Varian 620/f computer with Statos printer/plotter and turnkey software package.

Eglin Air Force Base, Fla., headquarters of the AF System Command's Armament Development and Test Center (ADTC) has installed its second Control Data Corp. 6600 to serve primarily as backup.

Service Merchandise Co., a catalogue showroom chain, has installed Spice electronic register systems from Pitney Bowes-Alpex, in four showrooms in Indiana, Tennessee and Alabama.



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El Paso Natural Gas Company, one of the country's largest and most progressive transmission companies, is currently seeking highly-qualified System Programmers with a minimum of 2 years experience in sysgens and BAL. Experience with telecommunications, PL 1, IMS, RJE, and installing an ASP System is desirable.

Current configuration is model 65 running HASP/MVT. MP 158's currently on order; delivery July '74. Present plan is to run ASP/MVT loosely coupled 158's, converting to VS/JES 3 tightly coupled 158's in 1974.

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El Paso Natural Gas Company  
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We are looking for a seasoned SYSTEMS ANALYST with approximately 5 years experience including a minimum of 2 years as computer programmer.

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University Station  
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Euclid Avenue and East Ninth Streets  
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## DATA SYSTEMS MANAGEMENT

The City of Los Angeles has created 2 new management level positions in its centralized Data Service Bureau. Currently in new facilities operating with a dual IBM 370/155 system, this Bureau with an operating budget of \$7 million and a staff in excess of 350, provides services for over 20 City departments and has become a national leader in urban systems development.

Duties, requirements, and salaries for each position are described below. Beginning salaries will be commensurate with qualifications.

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<p><b>ILLINOIS</b></p> <p><b>NEED TIME</b>            360/65 DOS 512 K with 7080 Emulator            12 Tape Drives            16 2314 Disk Drives            On and Off Line Printers            Interested in Selling Block Time            Five or Seven Days a Week            Located in Chicago Central Business District            Excellent Physical Facilities            Will Provide Office &amp; Storage            Call (312) 225-6800, Mr. Zimmer</p>	<p><b>NEW YORK</b></p> <p><b>I.B.M. 370/125</b>  <b>ALL SHIFTS</b></p> <p>128K Virtual Stor.            5-3410 Tapes            2-3330 Disk Drive            1403-1100 LPM Print Reader &amp; Punch            Weekends Available            EAM &amp; K/P Facility            N.Y.C. Downtown            (212) 363-4775-4888</p>	<p><b>IBM 360/370 USERS:</b>  <b>The Cost of Computer Time Just Went Down</b>            Going through a Conversion? LET GOLDEN FIFTY MAKE IT EASIER FOR YOU. AND SAVE YOU TIME AND DOLLARS!</p> <p><b>360/50</b> 256K, 2314 (9 spindles), 7-3420-M7, (9 TRK, 800/1600 BPI), 1-3420-3, (7 TRK, 800 BPI), 2-1403N2  <b>360/50</b> 512K, 2314 (9 spindles), 8-2401-M6, (9 TRK, 800/1600 BPI), 2-140361  <b>OFFLINE PRINTER—CPU TELETYPE TAPE CONTROL UNIT (1600 BPI), 1403N1</b></p> <p><b>360/50</b> 512 or 256K Rates  <b>8 A.M.—8 P.M.   8 P.M.—8 A.M.</b>            Weekdays \$65/Hour \$55/Hour            Weekends \$45/Hour \$45/Hour</p> <p><b>OFFLINE PRINTER RATES</b>            7 DAYS A WEEK—ALL HOURS \$20/HOUR  <b>ENJOY THE PRIVACY OF MODERN OFFICES SUPPLIED FOR DEBUGGING PROGRAMS, AND RESEARCH.</b>            Ample Storage Space Provided</p> <p><b>CALL: Hank Starkey or Dan Grey</b>            312/593-5410 or 5411  <b>COMPUTER SERVICE DIVISION</b>            5320 N. Kedzie Ave. • Chicago, Ill. 60625</p>	<p><b>I.B.M. - 360-30</b></p> <p>All Shifts 65K, 4-2401 MOD-2, 3-2311, 1403-N1, 2540, 1401 Compatibility            From \$35.00/Hour</p> <p><b>Restaurant Associates Ind.</b>            1540 Broadway bet. 45 &amp; 46th St.            New York, New York 10036</p> <p>Contact:  <b>Al Palmo at (212) 974-4966</b>  <b>Elliott Musikoff at (212) 974-4967</b></p>	<p><b>MMS GENERAL LEDGER</b>  <b>is hard at work for over 70 of the biggest US corporations* TO FIND OUT WHAT THEY KNOW THAT YOU DON'T, CALL:</b></p> <p>New York 212-972-9540            Chicago (312) 729-7410            Atlanta 404-255-0039            Los Angeles (213) 437-3301</p> <p><b>Software International Corporation</b>            2 Elm Square            Andover, Mass. 01810            (617) 475-5040</p> <p>*so are Accounts Receivable, Accounts Payable, Inventory Management packages.</p>	<p><b>ACCOUNTING SYSTEMS</b></p> <ul style="list-style-type: none"> <li>• Accounts Receivable</li> <li>• Accounts Payable</li> <li>• General Ledger</li> <li>• Fixed Asset</li> <li>• Sales Analysis</li> <li>• Report Writer</li> </ul> <p>More than 80 companies are successfully and profitably using these valuable management tools. For immediate information, call collect to the office nearest you.</p> <p><b>INFONATIONAL</b>            Chicago 312/332-6738            Dallas/Ft. Worth 817/732-6603            Los Angeles 213/383-4191            New York 212/469-1660            San Diego 714/238-6344            1119 Sixth Avenue            San Diego, Ca. 92101</p>	<p><b>Computerworld Sales Offices</b></p> <p><b>Vice President — Sales</b>  <b>Neal Wilder</b>  <b>Sales Administrator:</b>  <b>Dorothy Travis</b>  <b>COMPUTERWORLD</b>            797 Washington Street            Newton, Mass. 02160            (617) 332-5606</p> <p><b>Northern Regional Manager</b>  <b>Robert Ziegel</b>  <b>COMPUTERWORLD</b>            797 Washington Street            Newton, Mass. 02160            (617) 332-5606</p> <p><b>Mid. Atlantic Regional Manager</b>  <b>Donald E. Fagan</b>  <b>COMPUTERWORLD</b>            225 West 34th Street            Suite 1511            New York, N.Y. 10001            (212) 594-5644</p> <p><b>Los Angeles Area:</b>  <b>Bob Byrne</b>  <b>Robert Byrne &amp; Assoc.</b>            1541 Westwood Blvd.            Los Angeles, Calif. 90024            (213) 477-4208</p> <p><b>San Francisco Area:</b>  <b>Bill Healey</b>  <b>Thompson/Healey Assoc.,</b>            1111 Hearst Bldg.            San Francisco, Calif. 94103            (415) 362-8547</p> <p><b>Japan:</b>  <b>Yoshi Yamamoto</b>  <b>Nippon Keisoku Inc.</b>            P.O. Box 410            Central Tokyo, Japan</p>

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CRT's Per Controller	8 or 16	16
Non-Destructive Cursor	Optional	Standard
Colon Seeking Tab	Optional	Standard
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Character Address	No	Standard
Character Insert	No	Standard
Character Delete	No	Standard
Erase Display	Standard	Standard
Erase End Of Line	Optional	Standard
Erase End Of Screen	Optional	Standard
Repeat Key (All Char)	No	Standard
Printer (Optional)	15 cps	100 cps
Columnar Tab	No	Optional
Lower Case Alphabet	No	Optional
Function Keys	No	Optional
Numeric Inset	Optional	Optional

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## HIS Shipments Up

# Honeywell Scores Record Quarter, Half

MINNEAPOLIS — Honeywell Information Systems' earnings and revenues were ahead of those of last year, and Honeywell, Inc. scored record earnings and revenues in the second quarter and six months.

HIS, which produces about half of the company's revenues, set a new first-half record for shipments, with the Series 6000 the star performer.

### Team Effort

All sectors of the firm contributed to the first-half results, according to President James H. Binger, who cited the International Control Systems and Residential Division as major contributors.

Total computer revenues increased by more than 10% in the second quarter compared with those a year ago, and included an 11% gain in rental and service revenues.

Binger said more than 350 systems in the Series 6000 have been booked since its introduction in February 1971, with a value of more than \$750 million.

The rate of incoming orders for the 6025 introduced in May has been "very encouraging," he added.

Bookings rose from the first-quarter level and are ahead of

last year's, according to Binger. Net shipments continue to be substantially ahead of a year ago.

Computer rental and service revenues in the quarter rose to \$166.7 million from \$150.5 million in the 1972 period.

### 6 Month Figures

In the half year, the figure was \$322.4 million compared with \$298.1 million in the year-ago period.

Corporate earnings rose to \$20.8 million or \$1.10 a share, including a special credit of \$1.3

million, compared with \$15.1 million or 81 cents a share, including a \$1.6 million special credit.

Revenues rose to \$572.2 million from \$510 million in the 1972 period.

During the half year, earnings reached \$37.7 million or \$1.99 a share, including a \$2.1 million special credit, compared with \$26.3 million or \$1.41 a share, after a \$1.6 million special credit from tax-loss carryforwards.

Revenues rose 14.4% to \$1.098 billion compared with \$960.2 million in the year-ago period.

## NCR Continues Recovery, 2nd Quarter Shows Gain

NEW YORK — National Cash Register Co. continues to recover from its slump of last year caused by a strike and reduced sales in England following decimalization.

Second quarter earnings and revenues exceeded those of the first quarter, with six-month earnings totaling \$20.8 million or 90 cents a share.

This compares with a loss of \$2.2 million or 10 cents a share

in the same period last year.

Revenues for the six months totaled \$800.8 million compared with \$711.3 million in the 1972 period.

Incoming orders continue to exceed 1972 levels, with particularly strong results in overseas markets, the company said.

The international division reported a record volume in June.

The current large order backlog for new products now in volume production indicates continuing revenue growth for the remainder of the year, Chairman Robert S. Oelman observed.

But while international shipments are expected to continue to exceed 1972 levels, it is not anticipated that the increases during the second half will be as great as those experienced in the first half, according to Oelman.

In the second quarter, earnings, helped by a \$900,000 credit from the sale of a micropublishing operation, totaled \$13.4 million or 58 cents a share on revenues of \$433.4 million. The 1972 figures were \$3.9 million or 17 cents a share on revenues of \$384.5 million.

Computer operations and growth and efficiencies in the paper business were cited as aiding the firm's profitability.

In the six months, NCR recorded earning \$1 million from devaluation, and also noted a high level of shipments in the UK where sales were stimulated by the value-added tax.

## CDC Off in Quarter, but Earnings For Computer Operations Double

MINNEAPOLIS — Control Data Corp.'s computer operations segment is increasingly showing its muscle, with second-quarter earnings doubling to \$5.8 million from \$2.7 million a year ago.

Second quarter earnings for the firm declined to \$15.6 million or 95 cents a share from \$17.3 million or \$1.15 a share in the same 1972 period, reflecting declining earnings from the Commercial Credit Co. subsidiary.

The unit's earnings dropped to \$10.4 million from \$14.7 million in the same year-ago period.

Revenues excluding Commercial Credit rose to \$229.2 million from \$166.7 million in the year-ago quarter, reflecting the acquisition of Service Bureau Corp. in January. If the acquisition had occurred in 1972, earnings for the second quarter of 1972 would have been increased by \$1.8 million or 13 cents a share, the firm said.

In the six months, however, earnings rose to \$32.3 million or \$1.98 a share compared with \$27.6 million or \$1.83 a share in the same 1972 period.

Revenues jumped to \$432.2 million from \$295.7 million in the same year-ago period. If SBC had been acquired in 1972, the six-month revenues would have been increased by \$3.6 million or 25 cents a share, the firm said.

Growth in the computer services and strong demand for peripheral products were important contributors to earnings progress in the computer business, President William C. Norris said.

## More Storage for your buck— In Computerworld's August 29th Supplement.

Our August 29th Storage Supplement will look at a variety of alternatives to more efficient storage, including articles on:

- Virtual Memory: Something for nothing?
- Core vs. MOS Memories.
- User experiences with used disk and tape systems.
- Channel operations.
- User experiences with IBM 3330 replacements.
- What to ask when the floppy disk salesman comes calling.

If you want to keep up with this fast changing area, our August 29th Storage Supplement will be important reading. And if you're marketing products in this area, your ad should be there. For more information, contact your nearest **Computerworld** Representative. Or write to Judy Milford, **Computerworld**, 797 Washington Street, Newton, Mass. 02160. Supplement close is August 10th.

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COMPUTERWORLD



## Earnings Reports

AMPEX Year Ended April 28				LOGICON Year Ended March 31				ENNIS BUSINESS FORMS Three Months Ended May 31			
1973	1972			1973	1972			1973	1972		
Shr Ernd	\$ .34			Shr Ernd	\$ .45		\$ .56	Shr Ernd	\$ .19		\$ .13
b Revenue	256,604,000			Revenue	12,427,604		11,152,880	Revenue	11,510,390		9,946,666
Disc Op	(260,000)			Earnings	395,165		490,767	Earnings	451,004		320,791
c Spec Cred	2,781,000										
Earnings	3,654,000										
3 Mo Shr	.25										
b Revenue	65,220,000										
Disc Op	(541,000)										
Earnings	2,714,000										

a-Comparative figures unavailable.  
b-From continuing operations. c-  
From sale of Mandrel Industries.

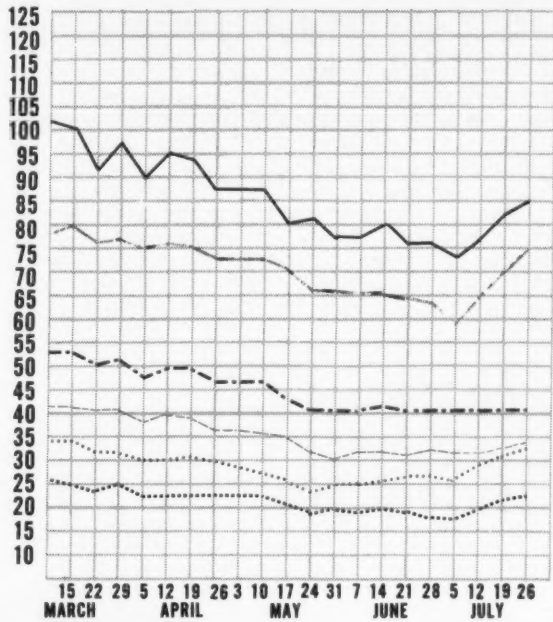
ADVANCED SYSTEMS Year Ended March 31			
1973	1972		
Shr Ernd	\$ .02		\$ .43
Revenue	3,414,000		3,296,000
Earnings	18,000		406,000
3 Mo Shr	.12		.08
Revenue	1,170,000		\$25,000
Earnings	122,000		\$1,000

COMPUTER INVESTORS GROUP Year Ended March 31			
1973	1972		
Shr Ernd	\$ .19		\$1.03
Revenue	17,160,000		13,902,000
Spec Item	d(500,000)		b29,000
Earnings	322,000		2,132,000

a-Restated. b-Credit; gain on repurchase of a portion of the company's debentures at less than the principal amount. d-Charge; provisions for estimated loss on investments.

## COMPUTERWORLD Computer Stocks Trading Indexes

Computer Systems      Software & EDP Services  
Peripherals & Subsystems      Leasing Companies  
Supplies & Accessories      CW Composite Index



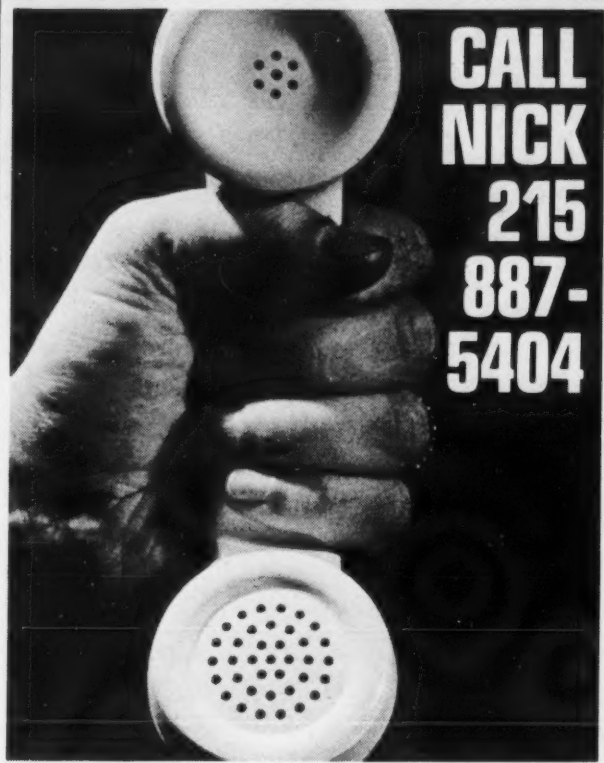
MICRODATA Three Months Ended May 31			
1973	1972		
Shr Ernd	\$ .03		\$ .14
Revenue	2,303,619		1,638,778
Tax Cred	26,000		93,194
Earnings	53,327		179,397
9 Mo Shr	.37		.34
Revenue	6,536,106		4,290,938
Tax Cred	271,000		217,890
Earnings	575,892		432,921

RAPID DATA SYSTEMS & EQUIPMENT Nine Months Ended March 31			
1973	1972		
Shr Ernd	\$ .65		\$ .30
Revenue	24,156,472		8,691,345
Tax Cred	240,000		308,000
Earnings	1,142,040		461,438

MANAGEMENT ASSISTANCE Three Months Ended March 31			
1973	1972		
Revenue	\$15,237,997		\$12,774,539
Spec Cred	432,592		374,234
Loss	523,550		1,313,216
6 Mo Rev	30,989,564		25,244,182
Spec Cred	870,962		785,151
Loss	281,175		1,768,282

AGS COMPUTERS Three Months Ended March 31			
1973	1972		
Shr Ernd	\$ .06		\$ .06
Revenue	404,838		299,698
Earnings	25,245		27,762

THE COMPUTER EXCHANGE Nine Months Ended March 31			
1973	1972		
Shr Ernd	\$ .17		
Revenue	5,374,215		3,155,233
Tax Cred	62,012		
Earnings	142,733		(904,273)



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1	1051 N1	Control Unit	Immediate
1	1052 8	Printer-KeyBoard	Immediate
1	2821 5	Control Unit	Immediate
5	2311 1	Disc Storage Dr.	8/31/73
2	2841 1	Storage Control	8/31/73
1	1403 N1	Printer	9/10/73

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## Computerworld Stock Trading Summary

All statistics compiled,  
computed and formatted by  
TRADE★QUOTES, INC.  
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PRICE						PRICE						PRICE					
1973		CLOSE	WEEK	WEEK		1973		CLOSE	WEEK	WEEK		1973		CLOSE	WEEK	WEEK	
RANGE		JUL 26	NET	PCT		RANGE		JUL 26	NET	PCT		RANGE		JUL 26	NET	PCT	
(1)		1973	CHNGE	CHNGE		(1)		1973	CHNGE	CHNGE		(1)		1973	CHNGE	CHNGE	
COMPUTER SYSTEMS																	
N	BURROUGHS CORP	211-245	240 1/2	+8 1/4	+3.5	D	COMPUTER COMMUN.	1- 4	1	0	0.0	O	ADVANCED COMP TECH	1- 2	1 5/8	0	0.0
N	COLLINS RADIO	16- 26	20 1/8	+ 1/2	+2.5	A	COMPUTER EQUIPMENT	2- 3	2 1/8	0	0.0	A	APPLIED DATA RES.	2- 4	2 3/4	+ 3/8	+15.7
O	COMPUTER AUTOMATION	5- 16	12 1/8	+1 1/8	+10.2	O	COMPUTER MACHINERY	1- 13	8	+1 1/4	+18.5	O	APPLIED LOGIC	1- 3	3/4	- 1/8	-14.2
N	CONTROL DATA CORP	31- 62	38 7/8	+3 7/8	+11.0	O	CONRAC TRANSPCEIVER	15- 32	18 5/8	+ 1/2	+2.7	N	AUTOMATIC DATA PHOC	30- 94	57	+3 3/4	+7.0
O	DATA GENERAL CORP	28- 46	40 1/2	+ 1/4	+0.6	O	CONRAC CORP	1- 3	1 3/4	+ 1/8	+7.6	O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	DATAPoint CORP	11- 21	13	+1 3/4	+15.5	O	DATA ACCESS SYSTEMS	9- 18	13 1/4	+ 1/2	+3.9	O	CENTRAL DATA SYSTEMS	0- 9	7 1/2	0	0.0
O	DIGITAL COMP CONTROL	2- 6	3 1/2	0	0.0	A	DATA 100	2- 4	4 1/8	+ 7/8	+26.9	O	COMPUTER DIMENSIONS	2- 5	2 1/2	- 1/4	-9.0
N	DIGITAL EQUIPMENT	73-105	93 1/2	+5 7/8	+6.7	O	DATA PRODUCTS CORP	2- 3	1 1/2	0	0.0	O	COMPUTER DYNAMICS	1- 2	3/8	0	0.0
N	ELECTRONIC ASSOC.	4- 9	5 5/8	+ 1/4	+4.6	O	DATA RECOGNITION	2- 5	2 1/2	+ 3/8	+17.6	O	COMPUTER HORIZONS	1- 6	2 1/2	+ 1/2	+25.0
A	ELECTRONIC ENGINEER.	6- 11	9 1/2	+ 1/2	+5.5	O	DATA TECHNOLOGY	8- 40	15 5/8	+2 3/4	+21.3	O	COMPUTER NETWORK	1- 5	1	- 1/8	-11.1
N	FOXBORO	23- 35	34 1/2	0	0.0	O	DECISION DATA COMPUT	1- 1	1/8	0	0.0	N	COMPUTER SCIENCES	2- 6	3 7/8	- 1/8	-3.1
O	GENERAL AUTOMATION	22- 35	34 1/2	+3 1/2	+11.2	O	DI/AN CONTROLS	2- 4	1 3/4	0	0.0	O	COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0
O	GRI COMPUTER CORP	1- 3	1 3/8	+ 1/8	+10.0	N	ELECTRONIC H & M	3- 6	4 1/4	+ 3/8	+9.6	O	COMPUTER TECHNOLOGY	1- 3	1	0	0.0
N	HEWLETT-PACKARD CO	74- 95	88	+4 3/8	+5.2	O	FABRI-TEK	5- 9	5 1/2	+ 1/2	+10.0	O	COMPUTER USAGE	4- 9	5	- 1/4	-4.7
N	HONEYWELL INC	98-139	117 7/8	+4 3/8	+3.8	N	GENERAL COMPUTER SYS	56- 76	63 5/8	+1 7/8	+3.0	O	COMPRESS	1- 2	1/4	0	0.0
N	IBM	299-340	318 3/4	+3 3/4	+1.1	N	HAZELTINE CORP	5- 9	6 1/8	- 1/4	-3.9	O	COMSHARE	4- 9	4 1/2	+ 1/4	+5.8
O	INTERDATA INC	7- 13	8 7/8	+ 3/8	+4.4	O	INFOREX INC	5- 23	8 5/8	+1 3/8	+18.9	N	CORDURA CORP	5- 15	6 5/8	+ 1/8	+1.9
N	MEMOREX	2- 19	4 7/8	0	0.0	O	INFORMATION DISPLAYS	1- 2	1/2	0	0.0	O	CYBERMATICS INC	1- 3	1 3/4	- 1/8	-6.6
O	MICRODATA CORP	2- 10	3 5/8	+1	+38.0	O	INFORMATION INTL INC	10- 15	12 1/4	+2	+19.5	O	DATATAB	2- 4	2	+ 1/4	+14.2
N	NCR	27- 38	37 7/8	+1 3/8	+3.7	A	LUNDY ELECTRONICS	3- 9	5 3/8	+1 1/8	+26.4	A	ELECT COMP PROG	1- 2	1 3/8	0	0.0
N	RAYTHEON CO	22- 34	25 1/2	-2	-7.2	O	MANAGEMENT ASSIST	1- 1	1/4	0	0.0	N	ELECTRONIC DATA SYS.	29- 56	41 3/4	+2	+5.0
N	SINGER CO	45- 74	57	+5 3/4	+11.2	A	MILGO ELECTRONICS	14- 28	19 5/8	+2 1/2	+14.5	O	INFORMATIONAL INC	1- 2	1/4	0	0.0
N	SPERRY RAND	36- 50	46	+ 7/8	+1.9	N	MONARK DATA SCI	4- 13	6 1/4	+ 3/4	+13.6	O	INFORMATICS	2- 6	4 1/2	0	0.0
A	SYSTEMS ENG. LABS	3- 8	4 1/4	+ 1/2	+13.3	O	ODC COMPUTER SYST.	2- 6	2	0	0.0	O	I.O.A. DATA CORP	1- 1	5/8	0	0.0
N	TEXAS INSTRUMENTS	83-107	105	+7 1/4	+7.4	O	OPTICAL SCANNING	2- 7	3 1/2	- 1/4	-6.6	O	IPS COMPUTER MARKET.	1- 5	1	0	0.0
O	ULTIMACC SYSTEMS INC	1- 11	5	+ 3/4	+17.6	O	PERTEC CORP	5- 8	5 1/2	+ 1/2	+10.0	O	KEANE ASSOCIATES	3- 4	3 3/4	+ 1/2	+15.3
N	VARIAN ASSOCIATES	10- 20	13 7/8	+1 1/8	+8.8	O	PHOTON	3- 7	3 3/4	0	0.0	O	KEYDATA CORP	6- 12	6 1/8	0	0.0
N	WANG LABS.	13- 34	19 3/4	+2 3/8	+13.6	A	POTTER INSTRUMENT	3- 9	5 1/4	+ 7/8	+20.0	O	LOGICON	3- 7	5 1/4	+ 3/4	+16.6
N	XEROX CORP	141-169	161 1/2	+6 1/2	+4.1	O	PRECISION INST.	2- 6	2 1/4	- 1/2	-18.1	A	MANAGEMENT DATA	2- 5	2 1/4	- 1/8	-5.2
LEASING COMPANIES						O	QUANTOR CORP	6- 10	6 3/4	+ 3/4	+12.5	O	NATIONAL CSS INC	18- 42	25 1/2	-1 1/2	-5.5
A	BOOTHE COMPUTER	1- 5	1 3/4	+ 1/8	+7.6	O	RECOGNITION EQUIP	4- 8	6 1/4	+1	+19.0	O	NATIONAL COMPUTER CO	1- 1	3/8	0	0.0
O	BRESNAHAN COMP.	1- 2	1 1/4	- 7/8	-41.1	N	SANDERS ASSOCIATES	7- 18	10 1/4	+1 1/8	+12.3	O	NATIONAL INFO SRVCS	1- 2	1/2	0	0.0
O	COMDISCO INC	6- 17	7 3/8	- 1/4	-3.2	O	SCAN DATA	1- 6	2 3/8	+ 1/8	+5.5	P	ON LINE SYSTEMS INC	12- 17	13 1/2	0	0.0
O	COMMERCE GROUP CORP	3- 4	4 1/4	+ 3/8	+9.6	O	STORAGE TECHNOLOGY	11- 34	15 5/8	- 1/8	-10.7	N	PLANNING RESEARCH	2- 7	3 5/8	+ 3/4	+26.0
O	COMPUTER EXCHANGE	1- 1	1/2	0	0.0	O	SYCOR INC	14- 24	11 1/4	+1	+9.7	O	PROGRAMMING METHODS	21- 25	24 1/2	+ 1/2	+6.5
A	COMPUTER INVSTRS GRP	2- 8	2 5/8	+ 1/8	+5.0	O	TALLY CORP.	2- 14	3 1/4	0	0.0	O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	COMP. INSTALLATIONS	1- 2	1	0	0.0	O	TEC INC	6- 9	7	+ 1/2	+7.6	O	RAPIDATA INC	5- 24	8 1/2	+2 3/4	+47.8
M	DATRONIC RENTAL	2- 3	2 1/8	0	0.0	N	TEKTRONIX INC	30- 53	42 1/4	+3 5/8	+9.3	O	SCIENTIFIC COMPUTERS	1- 3	3/4	0	0.0
A	DCL INC	1- 3	1 1/4	0	0.0	N	TELEX	3- 6	4	- 1/4	-5.8	O	SIMPLICITY COMPUTER	2- 4	1 7/8	0	0.0
A	DEARBORN-STORM	12- 26	16 7/8	-1 1/8	-6.2	O	WANGCO INC	7- 13	9 1/4	- 1/4	-2.6	O	TRS COMPUTER CENTERS	2- 4	1 3/4	0	0.0
N	DPF INC	5- 9	6 3/4	- 3/4	-10.0	O	WILTEK INC	8- 18	9 1/2	+1 3/4	+22.5	O	TCC INC	1- 1	1/2	0	0.0
O	EDP RESOURCES	1- 3	1 3/4	+ 1/8	+7.6							O	TYMSHARE INC	6- 12	9 1/2	+ 1/2	+5.5
A	GRANITE MGT	2- 6	4 1/2	+1 1/8	+33.3							O	UNITED DATA CENTER	4- 6	3 3/4	0	0.0
A	GREYHOUND COMPUTER	3- 6	4 5/8	+ 1/8	+2.7							A	URS SYSTEMS	4- 8	4 3/8	+ 1/4	+6.0
A	ITEL	4- 12	6	+ 3/8	+6.0	O	BALTIMORE BUS FORMS	5- 9	6	+ 1/4	+4.3	N	WYLY CORP	4- 11	5 7/8	+1 3/8	+30.5
N	LEASCO CORP	8- 18	11 3/8	-3/8	-3.1	A	BARRY WRIGHT	6- 13	8	0	0.0	PERIPHERALS & SUBSYSTEMS					
O	LEASPCORP	2- 8	2 3/4	0	0.0	A	DATA DOCUMENTS	17- 22	19 1/4	- 1/4	-1.2	N	ADDRESSOGRAPH-MULT	12- 34	15	- 3/4	-4.7
O	LECTRO MGT INC	1- 2	1 1/4	0	0.0	O	DUPLEX PRODUCTS INC	7- 10	8 3/4	+ 1/2	+6.0	O	ADVANCED MEMORY SYS	5- 23	6 1/4	-1	-13.7
O	NRG INC	6- 15	5 5/8	- 3/8	-6.2	N	ENNIS BUS. FORMS	5- 8	5 1/2	+ 1/4	+4.7	N	AMPEX CORP	4- 7	5 1/8	- 1/4	-4.6
A	PIONEER TEX CORP	5- 8	5 3/8	+ 1/2	+10.2	O	GHAHAM MAGNETICS	9- 20	13 3/4	+1 3/4	+14.5	O	ANDERSON JACOBSON	3- 6	3 3/4	+ 1/2	+15.3
A	ROCKWOOD COMPUTER	1- 3	1 1/2	0	0.0	O	GRAPHIC CONTROLS	8- 12	9 5/8	+ 7/8	+10.0	O	BEEHIVE MEDICAL ELEC	6- 10	6 3/4	+ 1/4	+3.8
N	U.S. LEASING	16- 36	21 3/4	+2 1/4	+11.5	N	3M COMPANY	78- 89	85	+1 1/8	+1.3	A	BOLT-BERANEK & NEW	6- 12	7	+ 3/4	+12.0
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH						O	MOORE CORP LTD	53- 60	56	- 1/4	-0.4	N	BUNKER-RAMO	6- 18	10	-1 3/8	-12.0
L=NATIONAL; M=MIDWEST; O=OVER-HE-COUNTER						N	NASHUA CORP	42- 58	51 3/4	-1 1/8	-2.1	A	CALCOMP	5- 13	9 3/4	+1 1/2	+18.1
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID						O	REYNOLDS & REYNOLD	40- 51	48 7/8	+4 7/8	+11.0	O	CAMBRIDGE MEMORIES	8- 15	11 5/8	+2 5/8	+29.1
(1) TO NEAREST DOLLAR						O	STANDARD REGISTER	14- 20	15 1/2	- 1/4	-1.5	O	CENTRONICS DATA COMP	13- 28	24	0	0.0
						O	TAB PRODUCTS CO	10- 23	9 1/2	0	0.0	O	CODEX CORP	9- 19	13	+2	+18.1
						N	UARCO	15- 23	17 1/4	+ 1/4	+1.4	O	COGNITRONICS	1- 3	2 3/8	+ 1/8	+5.5
						A	WABASH MAGNETICS	5- 7	6 5/8	- 1/8	-1.8						
						N	WALLACE BUS FORMS	15- 26	19	+1 3/4	+10.1						

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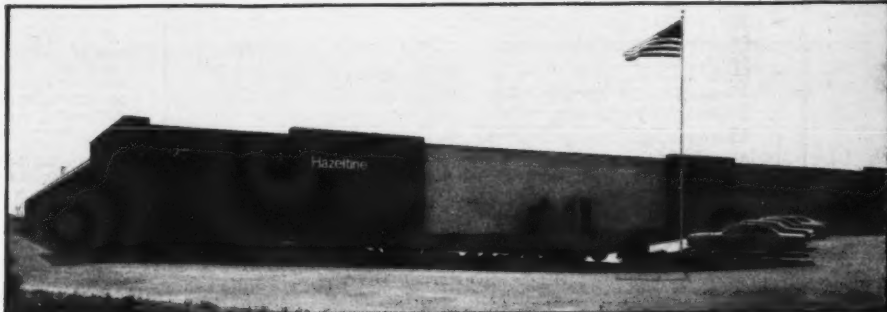
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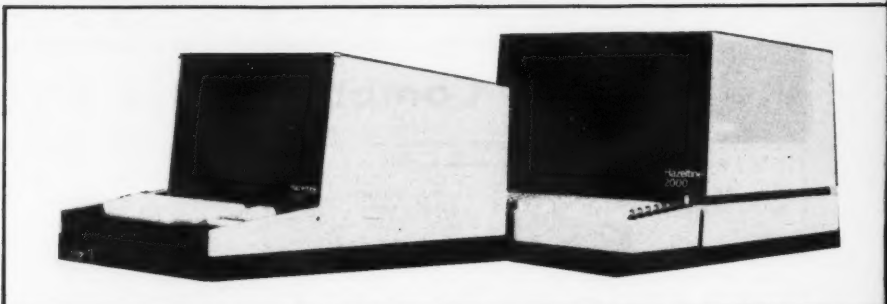
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